AD

Analysis of Ionospheric Parameters in Europe and Creation of the Prediction Algorithm

by

E.E.Tsedilina
A.Eviatar

February 1993

United States Army

EUROPEAN RESEARCH OFFICE OF THE U.S. ARMY

London England

CONTRACT NUMBER DAJA45-92-C0006

RAMOT UNIVERSITY

GEOPHYSICS & PLANETARY SCIENCE DEPARTMENT
OF TEL AVIV UNIVERSITY

Approved for Public Release; distribution unlimited

REPORT DOCUMENTATION PAGE

Form Approved OMB No. 0704-0188

1. AGENCY USE ONLY (Leave blank)	2. REPORT DATE	3. REPORT TYPE AND DATES COVERED

4. TITLE AND SUBTITLE

ANALYSIS OF IONOSPHERIC PARAMETERS IN EUROPE AND CREATION OF A PREDICTION ALGORITHM - (DRAFT) FINAL

5. FUNDING NUMBERS

DAJA 45-92-C-0006

6. AUTHOR(S)

PROF. E.E. TSEDELINA & PROF. A. EVIATAR

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)

RAMOT OF TEL AVIV UNIVERSITY
GEOPHYSICS & PLANETARY PHYSICS DEPT.
32 H. LEVANON ST., P.O.B. 39296,TEL AVIV 61392, ISRAEL

8. PERFORMING ORGANIZATION REPORT NUMBER

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)

USACCE, REGIONAL CONTRACTING OFFICE
BURTONWOOD, RAF BURTONWOOD
BURTONWOOD ROAD, GT. SANKEY WARRINGTON
WARRINGTON WAS 1UW, ENGLAND

10. SPONSORING/MONITORING AGENCY REPORT NUMBER

11. SUPPLEMENTARY NOTES

12a. DISTRIBUTION/AVAILABILITY STATEMENT

12b. DISTRIBUTION CODE

ABSTRACT

Investigation of the correlation and gradient characteristics of the basic parameters of the ionospheric profile (foF2 and H'F) and Maximum usable frequency (MUF(3000)F2) were estimated for the aim of the creation of ionospheric model for HF radio predictions and communications. Ionospheric data on European sounding stations (Digisondes) spaced at the distances of 1000 to 1100 km from each other were used for the period in one year from September 1990 to October 1991. Various diurnal and seasonal dependencies for all characteristics considered were obtained.

14. SUBJECT TERMS

spatial correlation, ionospheric parameters, temporal and spatial gradients, HF radio prediction, analysis, diurnal and season regularities, correlation probability, ionospheric data4

15. NUMBER OF PAGES

120

16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT
UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED	

NSN 7540-01-280-5500

Standard Form 298 (Rev. 2-89)
Prescribed by ANSI Std. Z39-18
298-102

CONTENTS

Acknowledgements

This report has been done by Dr. E.E. Tsedilina, Pr I, Dr. O.V. Weitsman, Co-I, and A. Ioffe with appreciating help of Prof. A. Eviatar.

2. INTRODUCTION

The creation of the corrected ionospheric models is urgently demanded for practical purposes of HF radio wave propagation. The basic parameters of these models can be corrected with the help of the real ionospheric information, obtained by monitoring vertical or oblique ionosondes.

Very often, a corrected ionospheric model (for instance, the function of electron concentration of the ionosphere N) must be created for the area around a central point θ_o, ϕ_o (θ-latitude, ϕ -longitude) in which the sounding station is situated. In this case the nodes F_{oi} of the electron density function $N(F_{oi}, h)$, or the basic parameters F_{oi} of the ionospheric profile $N_o(F_{oi}, h)$ in the point θ_o, ϕ_o, can be obtained with the help of this ionosonde, practically, in real time. These nodes or parameters F_{oi} describe the dependence of the function N on the height h. They describe also the variations of N with coordinates θ, ϕ and alternating geophysical parameters and conditions, for instance, such as time, solar flux, magnetic activity and so on.

Various approaches can be used for constructing the ionospheric model and finding the parameters F_i of the function $N(F_i, h)$ at any point θ, ϕ of space area around the central point θ_o, ϕ_o. For instance, one can use numerous ionospheric models /1-7/ and take the altitude description for the function N from one of them. Then the basic parameters F_{oi} of the function N_o in the central point θ_o, ϕ_o can be obtained using information from ionospheric central sounding station (see for instance /3,4/). The values of the parameters F_i at other points θ, ϕ of the area can be received with the help of preliminary study of spatial and time characteristics of ionospheric parameters P_i such as f_{min}, $f_{min}F$, $f_{min}E$, f_oF, $H'F$, $H'F2$, $M(3000)$, $MUF(3000)$, f_oF1, f_oE, $h'E$ and so on. Basic ionospheric parameters P_i are usually used to determine main

parameters F_i of the function $N(F_i,h)$. Correlation, gradient, Fourier or any other special mathematical method can be applied to analyze these ionospheric parameters.

For instance, if the correlation characteristics, such as the coefficient of correlation r between the parameters x and y at two points, coefficients of linear regression b_0 and b_1, mean values x and y of the parameters, are known for determined conditions, then the values of the parameters P_i at the point θ,ϕ can be easily found in linear approximation knowing the values P_{io} of these parameters in the central point:

$$P_i=b_{io}+b_{i1}F_{io}, \tag{1}$$

where coefficients of regression b_{io} and b_{i1} supposed to be dependent on the distance between the points θ_o,ϕ_o and θ,ϕ

$$S=R_0\arccos[\sin\theta\sin\theta_0+\cos\theta\cos\theta_0\cos(\phi-\phi_0)] \tag{2}$$

where R_o=6371 km is Earth radius. Of course, to apply (1) for the model is worthwhile if the value of r is relatively high.

Using gradient method, parameters P_i can be found with the first terms of the Taylor expansion

$$P_i(\theta,\phi)=P_{0i}(\theta_0,\phi_0)+\frac{\Delta P_i}{\Delta\theta}(\theta-\theta_0)+\frac{\Delta P_i}{\Delta\phi}(\phi-\phi_0) \tag{3}$$

Here $P_{i\theta}=\Delta P_i/\Delta\theta$ and $P_{i\varphi}=\Delta P_i/\Delta\phi$ are latitudinal and longitudinal gradients of the parameter P_i at the point $\theta=\theta_o,\phi=\phi_o$. The gradients are usually determined between the points, where ionospheric stations are situated using data from ionospheric stations. These gradients $P_{i\theta},P_{i\phi}$ as well as the coefficients of regression b_{io} and b_{i1}, also depend on the time of day, season of the year, geophysical conditions, and vary with the distance or coordinates θ,ϕ.

In any case, in reality the values of correlation characteristics or gradients in a prediction ionospheric model can

be obtained as a result of special numerical analyses of ionospheric parameters and their averaging for some time - periods and determined conditions. Such analyses were performed using ionospheric data at three European vertical sounding stations for 1990-1991. They are presented in this Report.

3.IONOSPHERIC DATA

Ionospheric digital data were taken at three European stations with Digisondes: Dourbes (50,1°N;4,6°E), Belgium; Roquetes (40,8°N;0,3°E), Spain, and Rome (41,8°N;12,5° E), Italy, spaced for the distance of the order 1000-1100 km from each other. Vertical digital ionograms were scaled automatically on these stations, using a special program-the Automatic Real Time Ionogram Scaler with True Height(ARTIST)/8-9/. Amplitude, phase, incidence angle, polarization and Doppler shift measured by the Digisonde are analyzed to extract the over head ordinary and extraordinary traces even during disturbed ionospheric conditions. The electron density profile may be calculated from the ordinary trace using profile-fitting method. Modern Digisondes having the ARTIST facility yield separate fourth-order Chebychev polynomials for the electron densities in E, F1 and F2-regions /10/. Whereas the ARTIST scales 18 parameters P_i, only selected basic parameters are reported here for 1990-1991.

Diurnal variations of these parameters at the sounding stations were measured at hourly intervals. Some examples for critical plasma frequency variations were given in the Second Interim Report (1992). Data covering one year period were written on these stations in special codes, approximately in 1000 files and at 100 diskettes. They include twelve ionospheric parameters, scaled by the ARTIST. A lot of contradictions inside the data were discovered during processing the data stored on the diskettes. For instance, in some files, intermediate points are present in addition to the points with hourly interval. In other files, on the contrary, some points at hourly intervals are absent or sometimes

they are given twice or not in successive time order. In addition to these contradictions and some others it turned out that information at diskettes have been written in different formats. The format was changed even at one and only one station during the period in one year. All these difficulties additional to ordinary ones which occur when you must work with big amount of files and diskettes had forced us to rewrite the information presented at different diskettes from three stations to one big file stored on one diskette in one and only one format. A special program transferring the data from different formats to single format and presenting it in convenient way of storage was created. This considerably facilitated the subsequent analysis of ionospheric parameters.

3.1. Program for viewing an ionogram on computer screen

Ionospheric ionograms are given on diskettes at station Roquetes except the arrays of ionospheric parameters. However, they are given in a format which makes it impossible to view the whole ionogram on a computer screen and only the part of one ionogram can be seen on a screen at one moment. To make it possible to view and check the whole ionogram on computer screen a special TURBO-PASCAL program was created. This program is given in Appendix 1. It allows easily to look at the ionograms on a screen, print them and find some discrepancies with digital values of ionospheric parameters on diskettes. Ionograms can be mapped in foreground color symbols.

This program produces some possibilities for user:

1. The program prompts the user for the file name and the ionogram in this file is produced.
2. All files on floppy disk are browsed and all ionograms are mapped.
3. This program gives a possibility to isolate individual components of the ionogram such as ordinary or extraordinary traces, to filter noises and ctr.

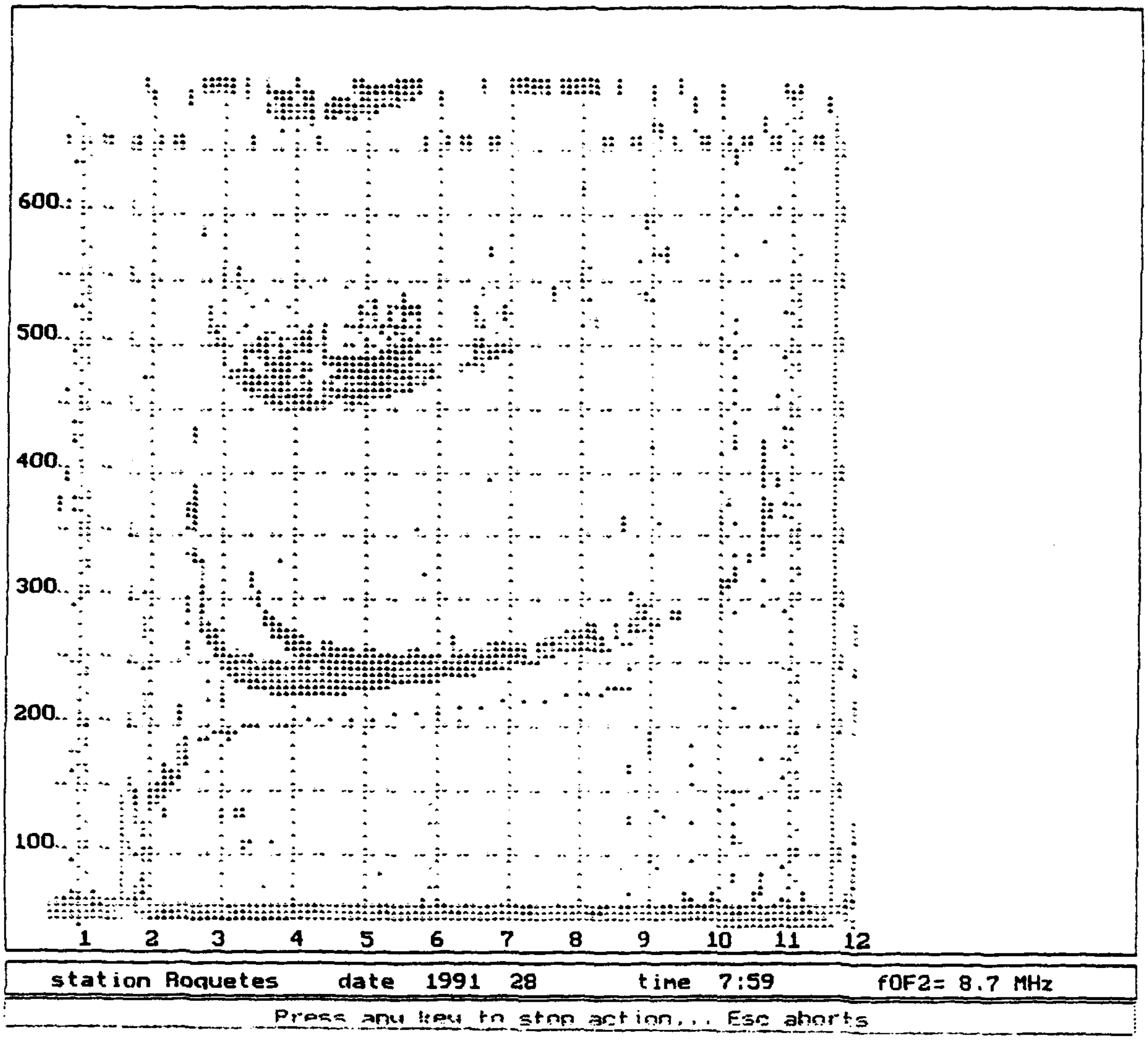


Figure 1a. View of reduced ionogram on the computer screen, station Roquetes, 28 January 1991, 07.59 UT.

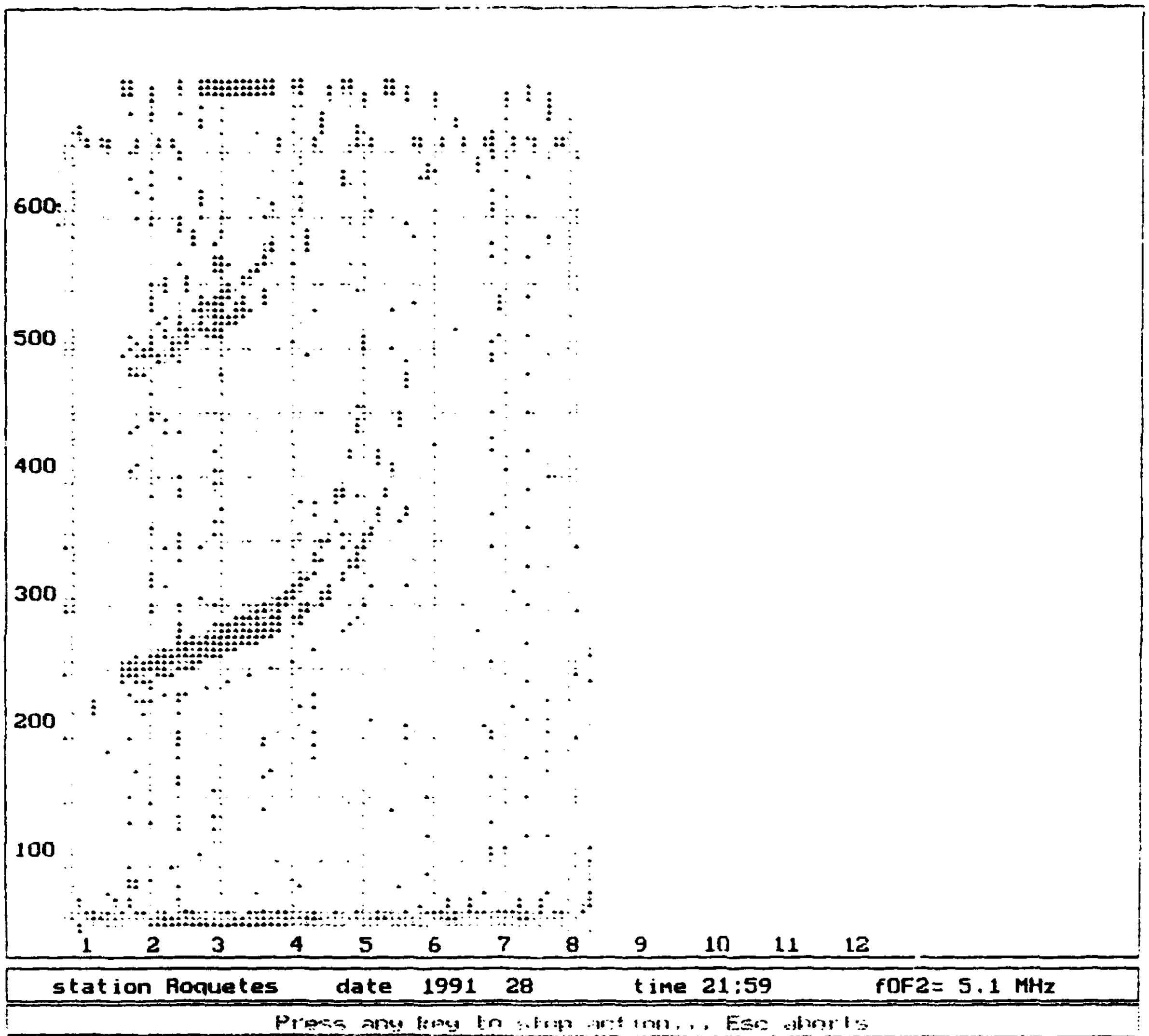


Figure 1b. The same as in Fig. 1a for 21.59 UT.

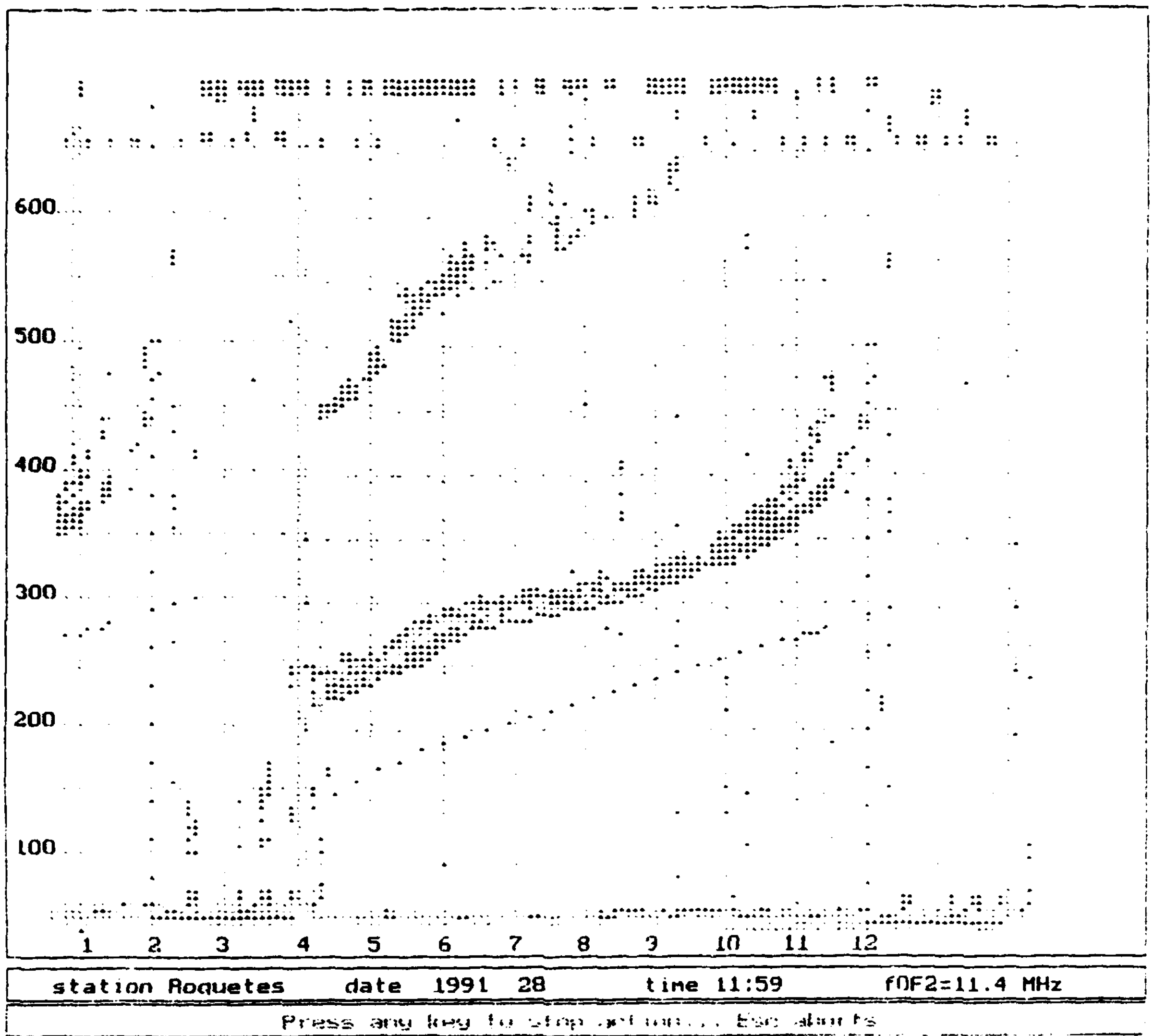


Figure 1c. The same as in Fig. 1a for 11.59 UT.

Station, date (year and the number of day), time and value of ordinary critical frequency f_oF2 are given on the bottom of the ionogram.

Some examples of ionograms, obtained using this program, are given in Fig.1a,b,c. It is seen in the ionogram, Fig. 1a, that the value of f_oF2 equal to 8,7 MHz and scaled by the ARTIST-program is less than the actual value of f_oF2 on the ionogram.

4. CORRELATION ANALYSIS

Spatial correlations of the ionospheric parameters at European stations have been considered in /12-15/.

Rush and Miller /12/ using measured vertical-incidence ionosonde data have examined the spatial correlation coefficients of the daily departures of critical electron frequency (f_oF2) from the monthly median values. Their results have been expressed as mean relationships giving a near linear decrease of correlation coefficient with increasing separation. Data have been grouped for E-W and N-S separations and for different local-time periods and seasons (Fig. 2a). Whilst there are evident departures for some paths and periods they find that generally the correlation coefficient drops to 0.87 at a distance of 500 km in N-S separation and 1000 km in E-W. There was systematically slightly less correlation during the winter nights than at other times.

The area of influence over which measured data at a particular observation point provide an indication of ionospheric conditions at other points may be regarded as elliptical, Fig. 2b /13/.

Spatial correlation coefficients of ionospheric parameters for two European stations have been also considered by Soicher and Gorman /14/.

Milson /13/ has performed similar analyses using European data with comparable results. He concluded that there is a greater

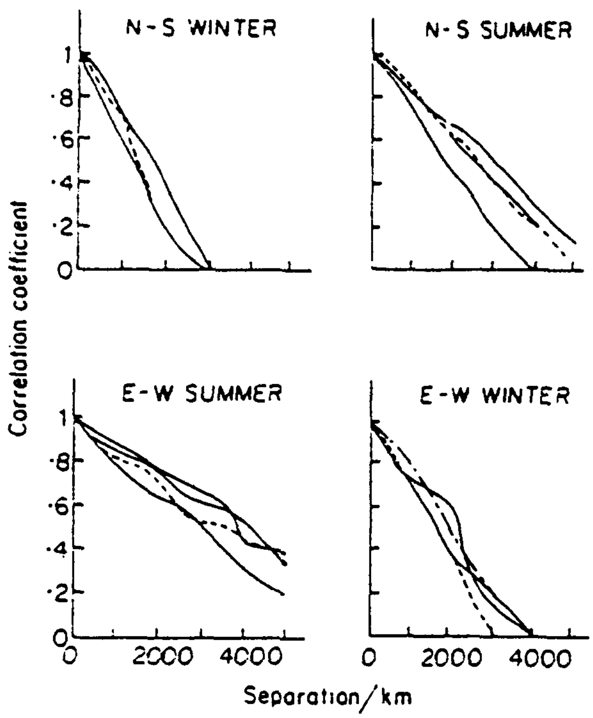


Fig.2a Variation of correlation coefficient of day-to-day departures of foF2 from the local monthly median value with separation (from Rush and Miller /10/).

(separate curves are for different times of day)

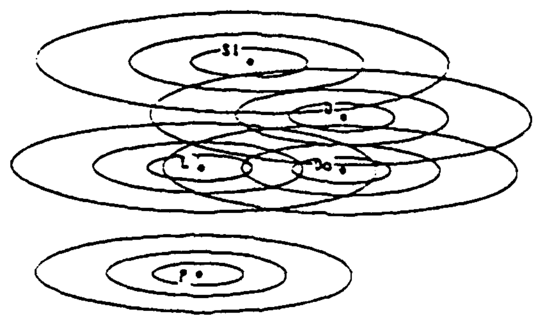


Fig.2b Idealised representation showing correlation coefficient ellipses at levels of 0.7, 0.5 and 0.3 applied to European measurement data/11/.

Sl - Slough; Do - Dourbes; L - Lannion; D - De Bilt; P - Poitiers

dependence of correlation distance on season than on solar epoch. Correlation distances seem to be greater for magnetic storm days.

4.1. Estimation of correlation coefficients

Estimation of cross correlation coefficients between each two points (or stations) from all three points (stations) was performed using common statistic formulas

for mean values:

$$\overline{x}=\sum_{i=1}^{n} x_i/n\ , \quad \overline{y}=\sum_{i=1}^{n} y/n\ , \tag{4}$$

for RMS (S_x, S_y):

$$S_x=\{\frac{1}{n-1}[\sum_{i=1}^{n} x_i^2-\frac{(\sum_{i=1}^{n} x_i)^2}{n}]\}^{\frac{1}{2}}\ , \tag{5}$$

$$S_y=\{\frac{1}{n-1}[\sum_{i=1}^{n} (y_i)^2-\frac{(\sum_{i=1}^{n} y_i)^2}{n}]\}^{\frac{1}{2}}\ ,$$

for the coefficients of regression b_o and b_1 (linear line of regression $y=b_o+b_1x$):

$$b_1=\frac{\sum_{i+1}^{n}(x_i-\overline{x})(y_i-\overline{y})}{\sum_{i=1}^{n}(x_i-\overline{x})^2} \tag{6}$$

$$b_o=\overline{y}-b_1\overline{x}\ , \tag{7}$$

and for cross correlation coefficient r:

$$r=\frac{b_1S_x}{S_y}=\frac{\sum_{i=1}^{n}(x_i-\overline{x})(y_i-\overline{y})}{(n-1)S_xS_y}=$$

$$=b_1\left(\frac{n\sum_{i=1}^{n}x_i^2-\left(\sum_{i=1}^{n}x_i\right)^2}{n\sum_{i=1}^{n}y_i^2-\left(\sum_{i=1}^{n}y_i\right)^2}\right)^{\frac{1}{2}}. \qquad (8)$$

Here x_i and y_i are the values of ionospheric parameters (f_oF2, f_{min}, *H'F*, *MUF(3000)* and so on...) to be taken at two considered stations on the same moments of time or the same moments of Local Time.

Formulas (4)-(8) were applied providing correlation analysis of ionospheric parameters at European stations.

Coefficients r, b_o, b_l for the parameters f_oF2, f_{min} (minimum observed frequency) and *H'F* (minimum *F* layer virtual height) as well as the mean values of these parameters and regressive lines for them for March 1990 were presented in the First and Second Interim Reports. These characteristics were obtained on both stations for the same integer UT moments. Because of the fact that the ionospheric parameters are given with one hour interval the nearest to these moments data were taken performing calculations. The difference in time for these points did not exceed 20 minutes.

Correlation characteristics of ionospheric parameters f_oF2, *MUF* and *H'F* for the time-period in one year from September 1990 to October 1991 in Local Time are given in this Report. The comparison of these results with previous ones made in UT has shown that, in general, correlation in LT is higher.

4.2. Interpolation of initial arrays of data

As the ionospheric parameters were scaled in hourly interval, to make it possible to work in LT it was necessary to interpolate them between integer values of hours. It was done using spline interpolation with the polynomials of the third order. The second derivatives on the boundaries set to be zero. Interpolation

procedure was applied only to the intervals with one or two absent consecutive integer points. If the number of missing points is greater than two, interpolation is not performed at all.

4.3. Mean values and RMS

Diurnal distributions of mean values of f_oF2 (4) for eleven months from January to November of 1991 (numbers 1-11) are given in Fig. 3a. It is seen that mean values of f_oF2 usually are higher for stations Rome and Roquetes than for Dourbes. This phenomena can be easily explained by the fact that the locations of Rome and Roquetes are closer to equator then those of Dourbes. The decrease of f_oF2 in summer is seen evidently or increase in winter (winter anomaly) and in spring and autumn. Mean values of critical frequencies from March 1991 to February 1991 are shown also in Fig. 3b-3c in somewhat different form.

The differences between mean and median values of critical frequencies are seen in Fig. 3b. These differences are not large. Maximum differences are less than one MHz and usually less than 0.5 MHz.

The mean values of the parameters f_oF2, $H'F$ and MUF are given in Tables of the Appendix 2 with two hourly interval. The total number of points with non-zero values of parameters for every considered month n=N (see (4)) is also displayed in these Tables.

Diurnal distributions of f_oF2 RMS (4) for all stations are shown in Fig. 4. RMS (S_x, S_y) for all parameters considered are given in Appendix 2. In general, they are of the order from 0.4 to 2.0 MHz and are large at day-time as well as those for f_oF2 .

4.4. Coefficients of correlation and regression

Coefficients of regression b_o (6) and b_1 (7) and coefficients of correlation r (8) for parameters f_oF2, MUF and $H'F$ and for the

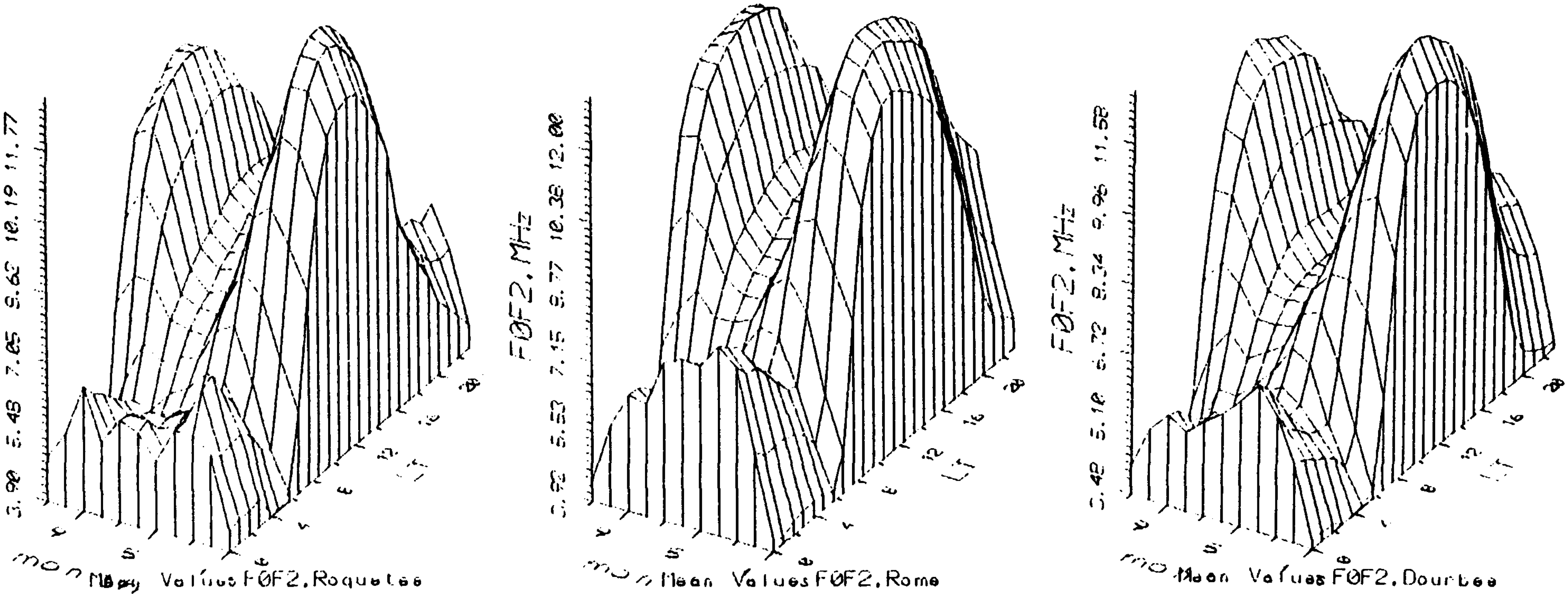


Fig.3a. Mean values foF2 as a function of Local Time at three European stations. Numbers 1-11 correspond to the months January-November.

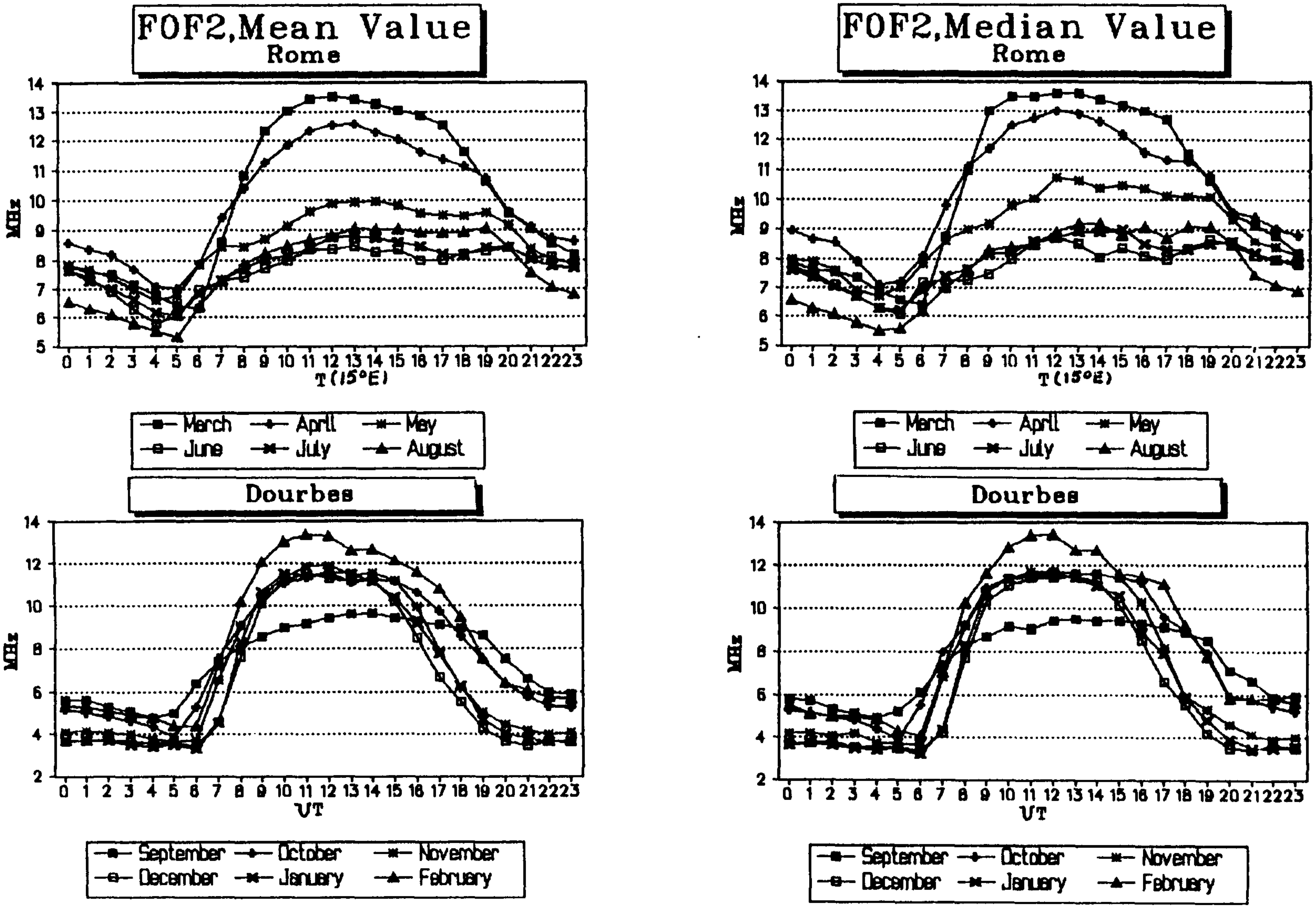


Figure 3b. Mean and median values of ordinary wave critical frequency foF2 from March 1990 to February 1991, stations Rome and Dourbes.

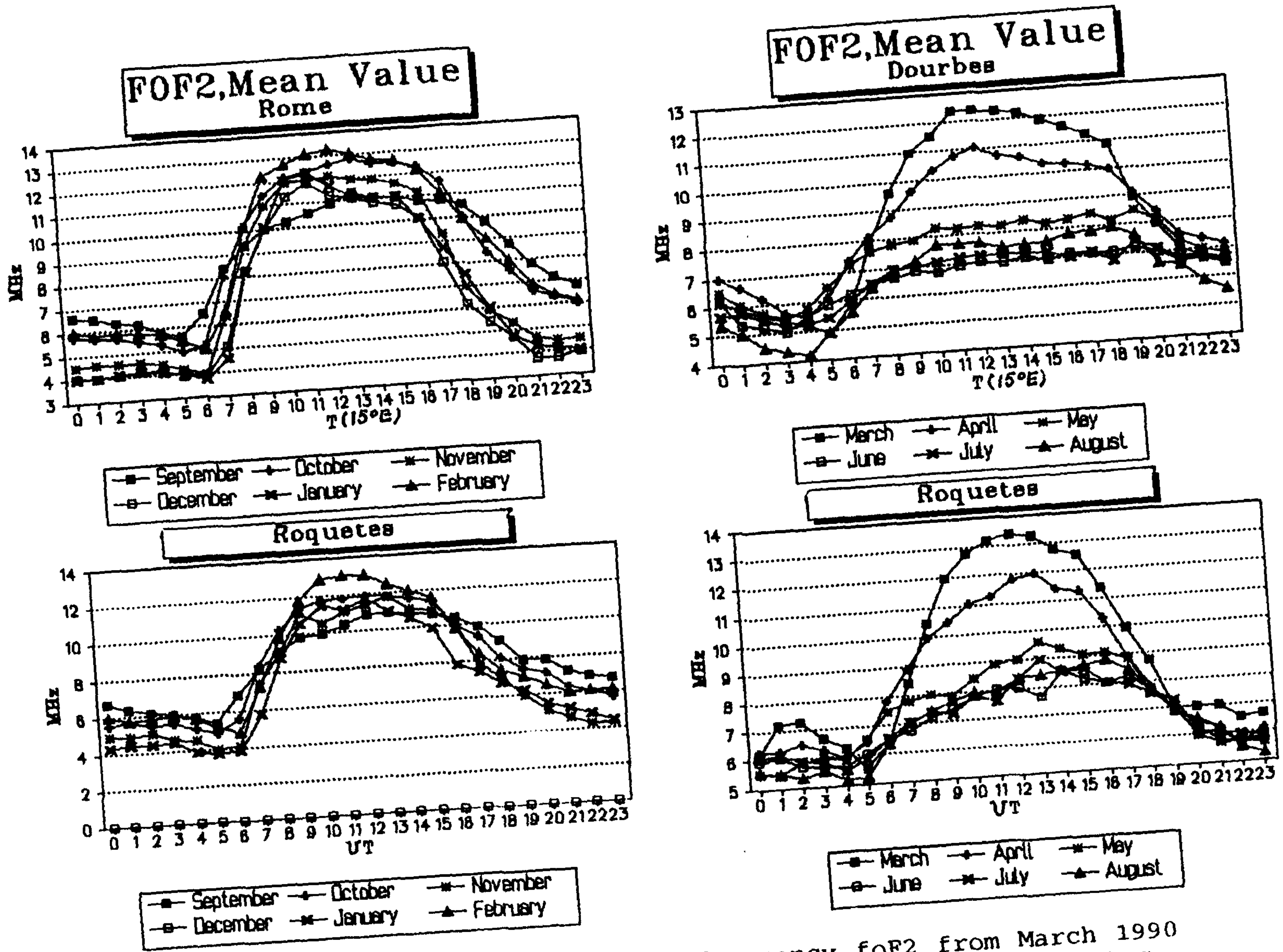


Figure 3c. Mean values of plasma frequency foF2 from March 1990 to February 1991, stations Rome, Dourbes and Roquetes.

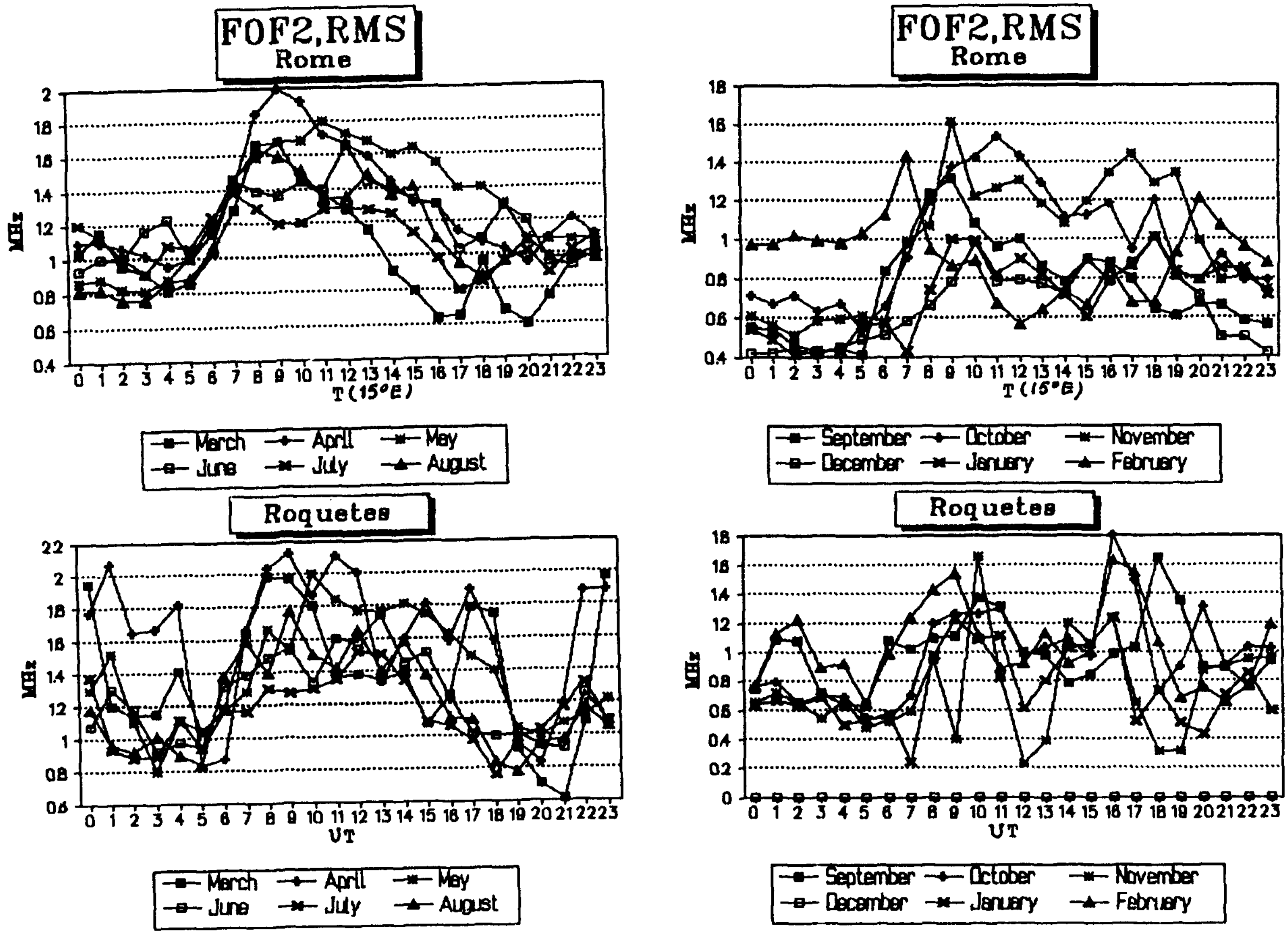
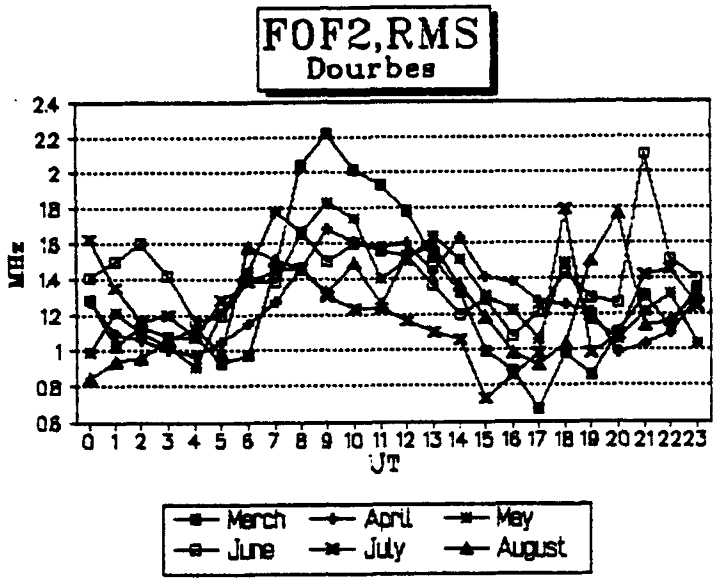


Figure 4a. RMS of plasma frequency foF2 from March 1990 to February 1991, stations Rome and Roquetes.



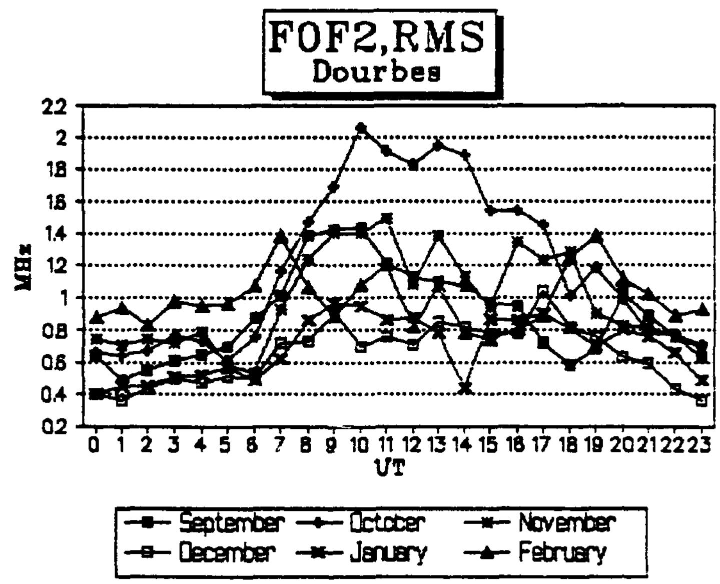


Figure 4b. The same as in Fig. 4a, station Dourbes.

stations considered are shown in Fig. 5-8. and in Appendix 2. Figures 5-8 represent diurnal variations of correlation coefficient r for each season of the year considered and for each two ones from the three sounding stations.

It is seen that correlation coefficient and other statistical characteristics have diurnal and seasonal regularities (see also Second and Third Interim Reports). Notice that all analyses reported here were made for the conditions of high solar activity (Mean sun monthly spot number R is of the order 140 to 240).

Correlation probability $P=n_i/N$ of the days with coefficient of correlation $r>0.7$ $(P=P(r>0.7))$, where n_i is the number of points for the season considered with $r > 0,7$ and n is the total number of calculated points of r for this season, is given in Table 1 in percents (upper numbers) for each pair of stations. Lower numbers show the value of n_i. Total number of points for one month in Fig. 5-8 is equal to 24, *for the season* - to 72. In Table 1 the number in parentheses show the quantity of points for the season. If the number is absent, it means that the total number is equal to 72.

Table 1. Season correlation probability $P(r>0.7)$ of critical frequency in percents.

Stations	Summer	Spring	Autumn	Winter
Rome- Roquetes	44.4 32	40.2 29	62.5 30 (48)	33.3 16 (48)
Rome- Dourbes	87.5 63	86.1 62	75.0 36 (48)	45.8 22 (48)
Dourbes- Roquetes	59.7 43	69.4 50	62.5 30 (48)	45.8 22 (48)
Mean	63.9	65.2	66.7	41.6

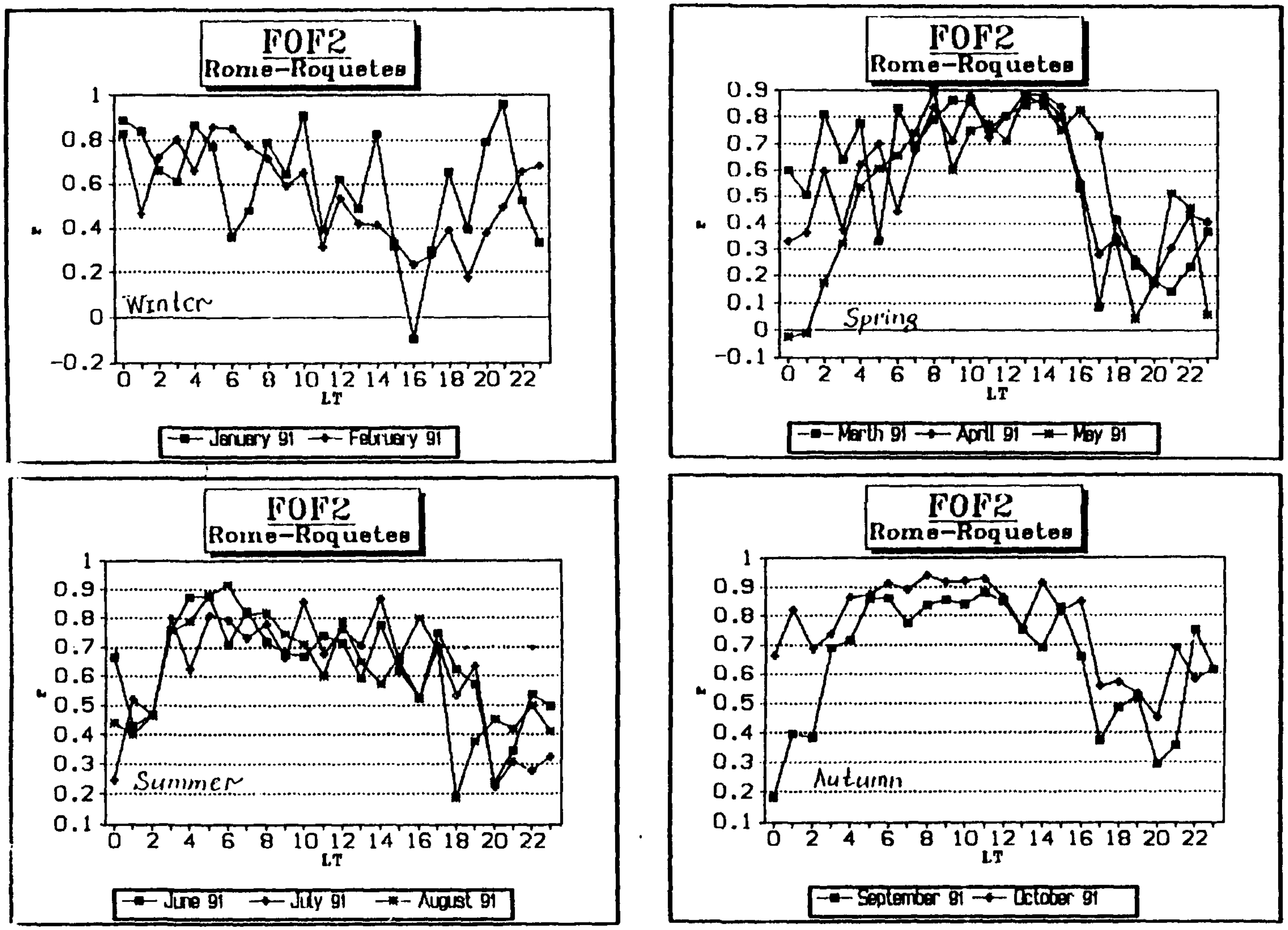


Figure 5a. Diurnal variations of cross correlation coefficient r for the parameter foF2, for various seasons of 1991, sounding stations Rome and Roquetes.

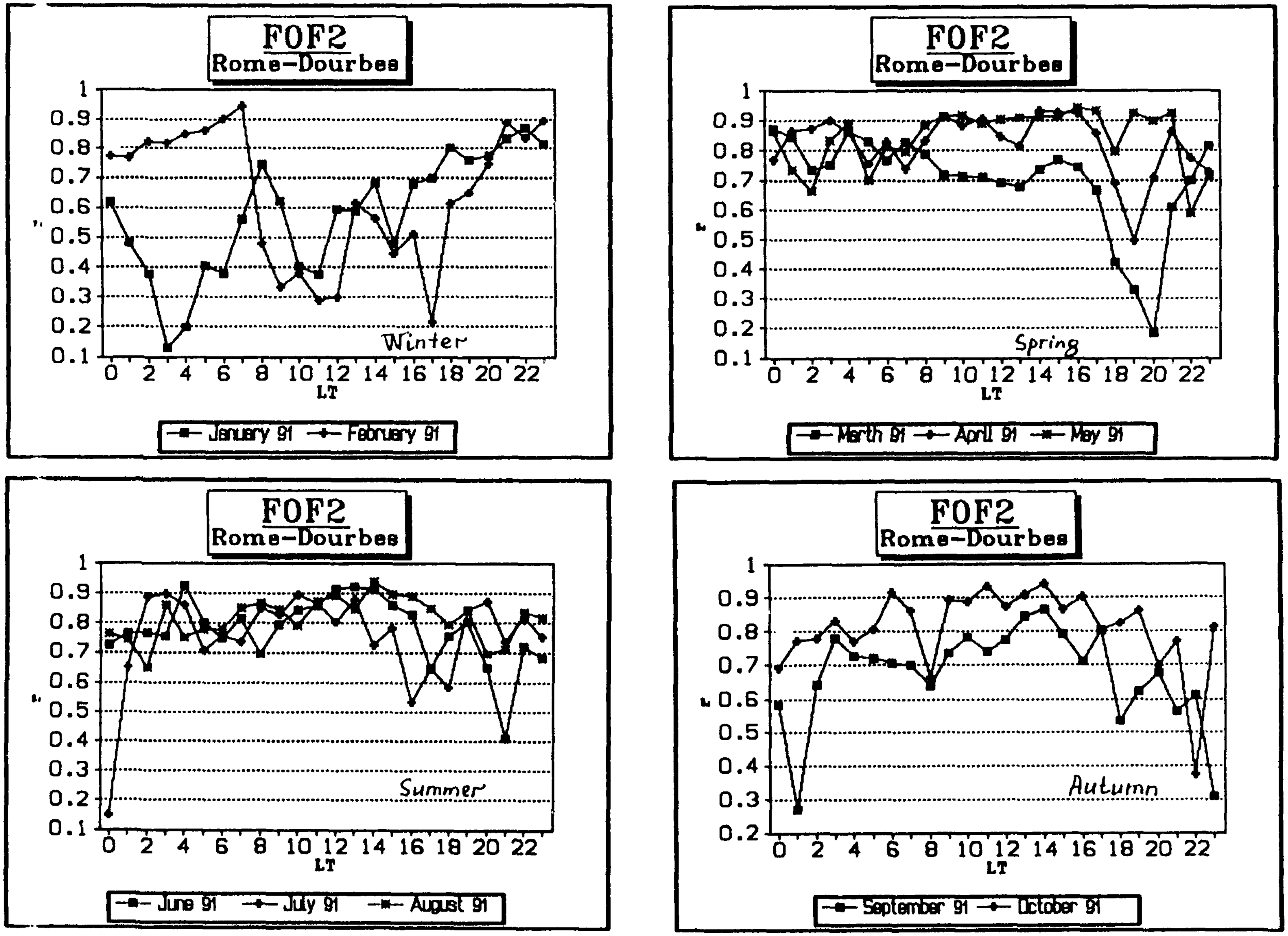


Figure 5b. The same as in Fig. 5a for Rome and Dourbes.

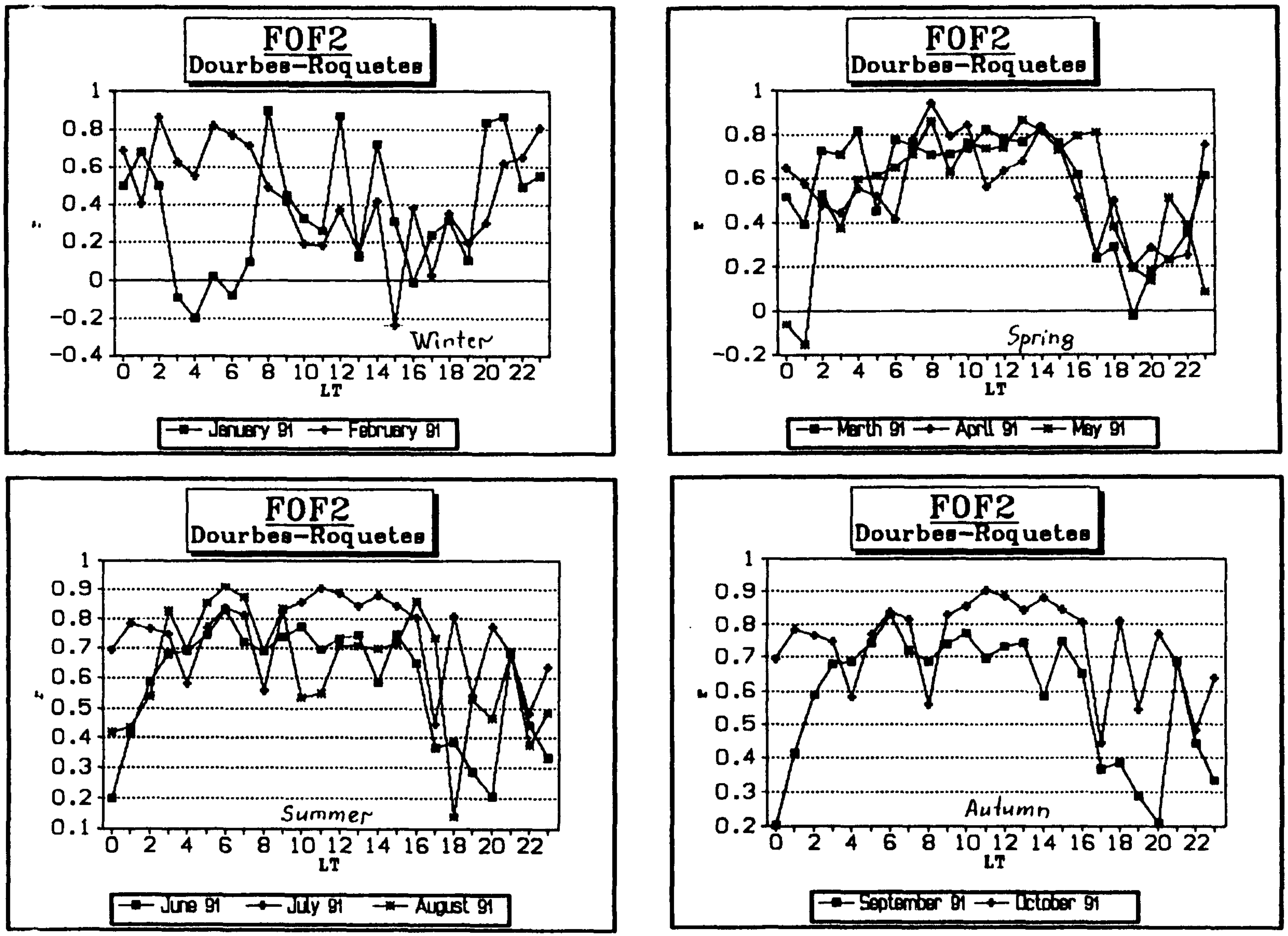


Figure 5c. The same as in Fig. 5a for Dourbes and Roquetes.

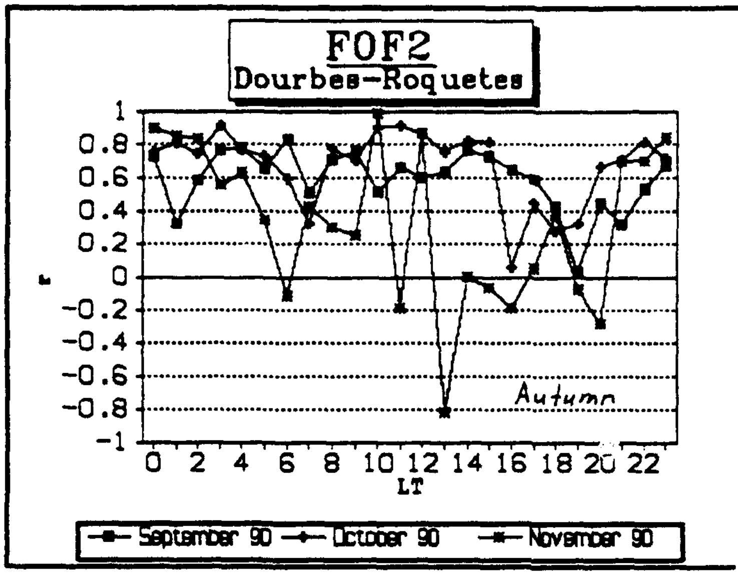
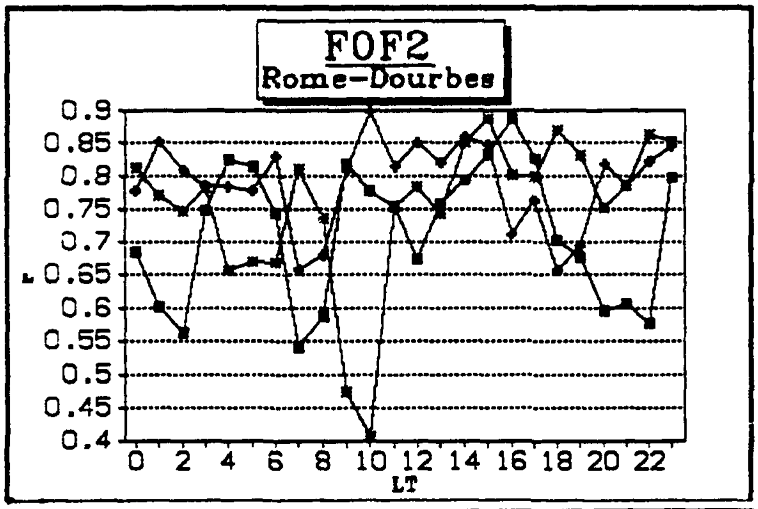
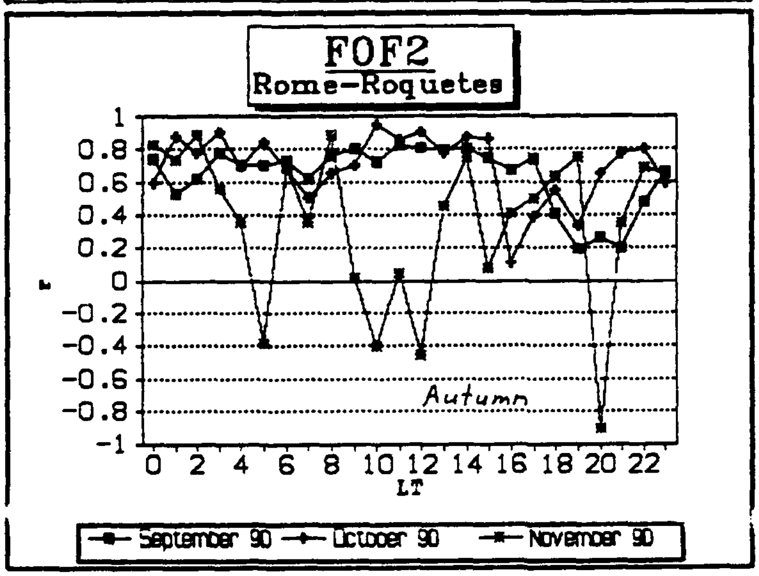


Figure 6. Diurnal variations of cross correlation coefficient r for parameter foF2, for the autumn of 1990.





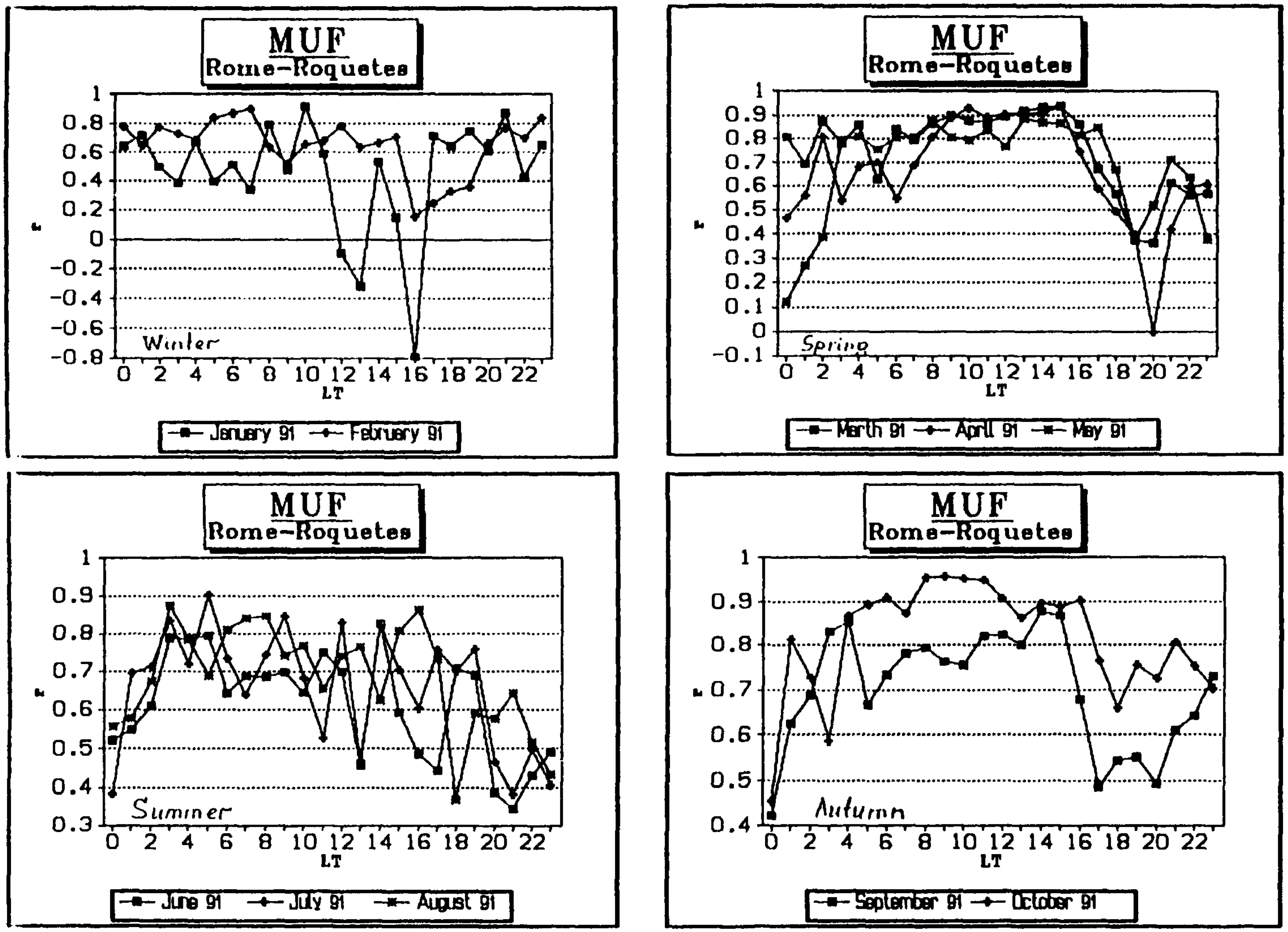


Figure 7a. Diurnal variations of cross correlation coefficient r for the parameter MUF, for various seasons of 1991, sounding stations Rome and Roquetes.

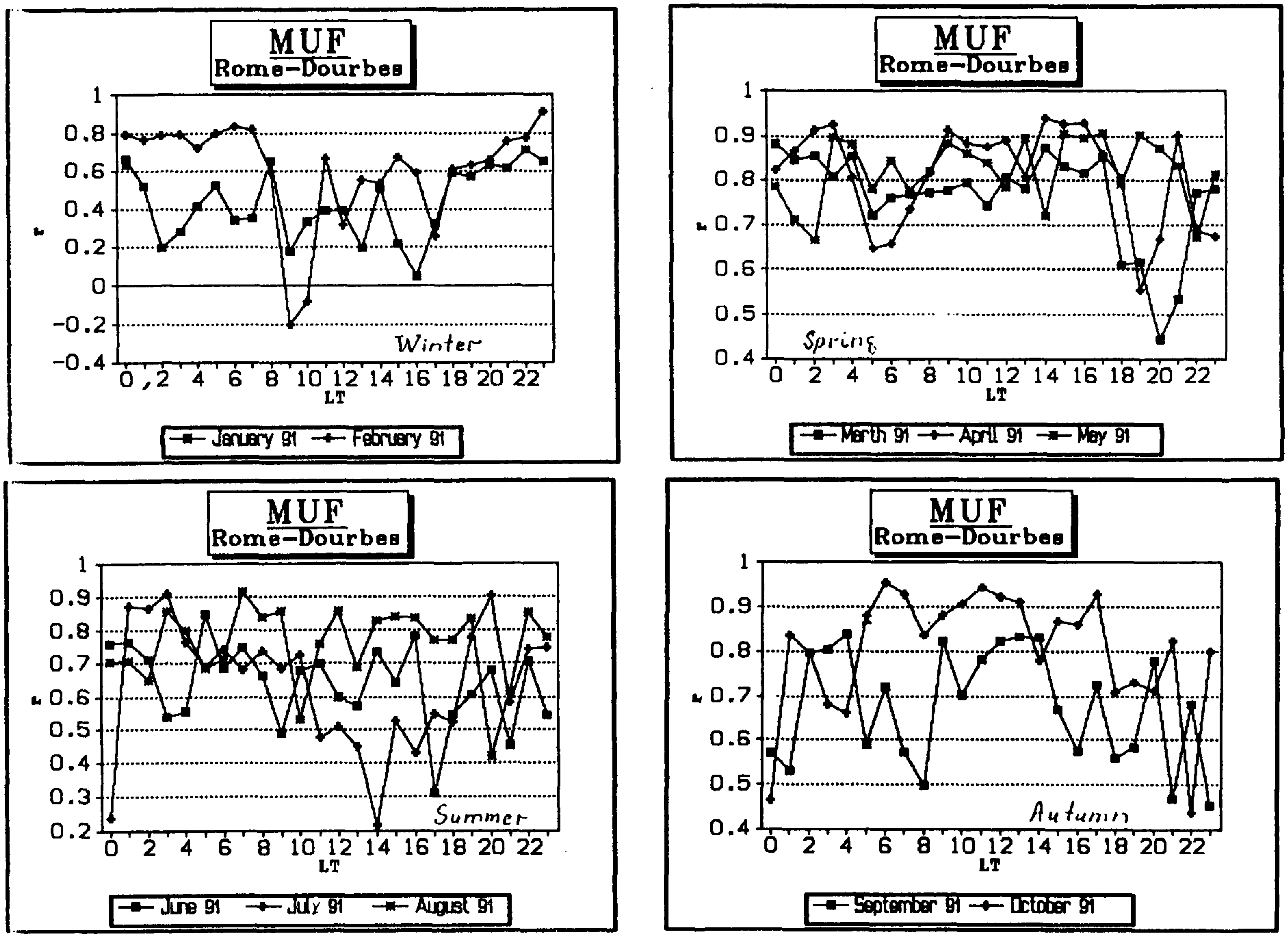


Figure 7b. The same as in Fig. 7a for Rome and Dourbes.

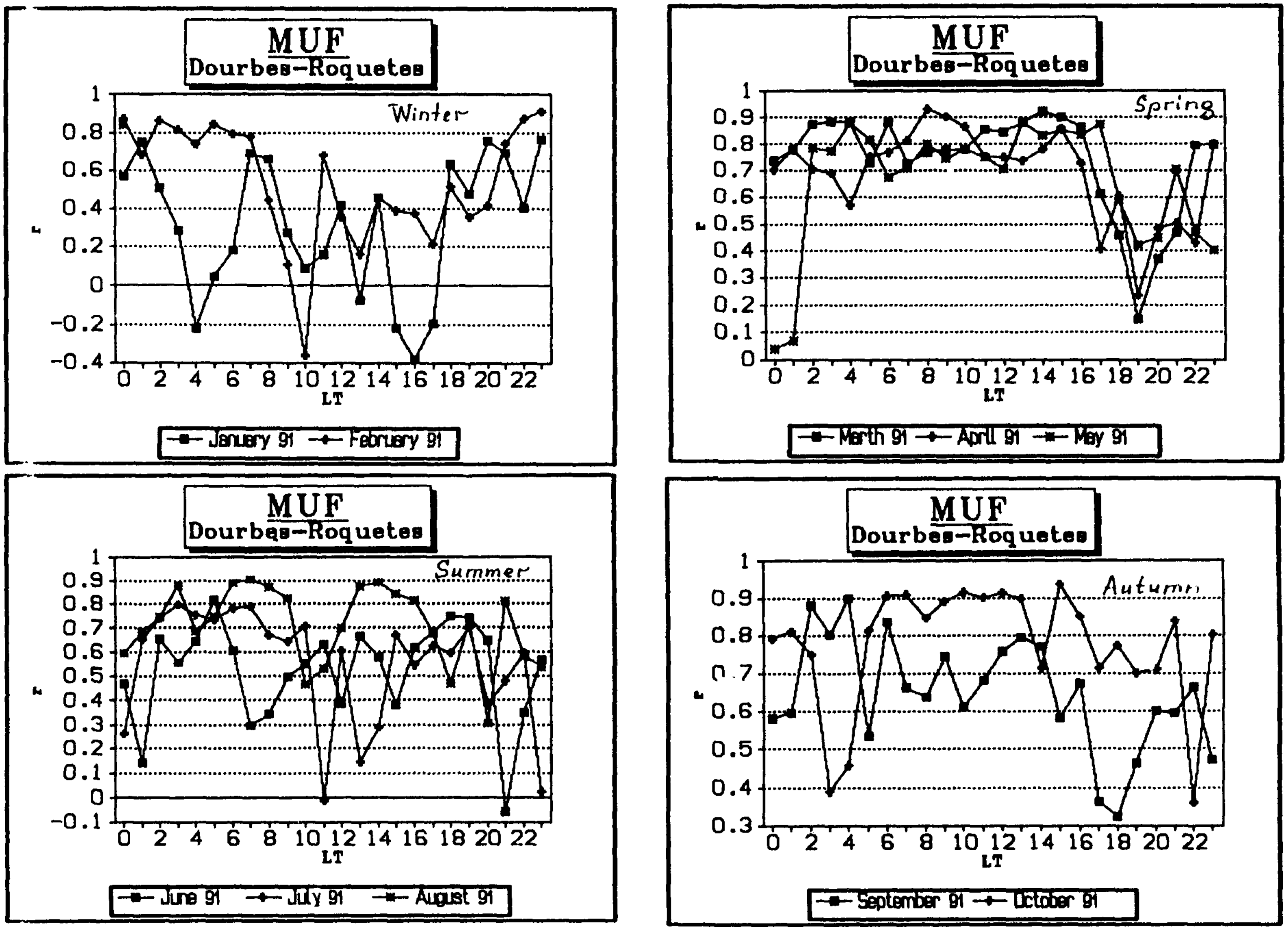


Figure 7c. The same as in Fig. 7a for Dourbes and Roquetes.

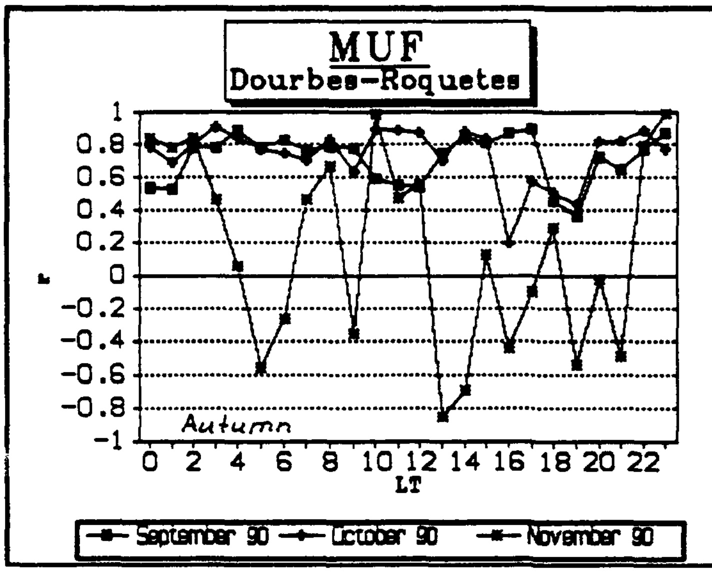
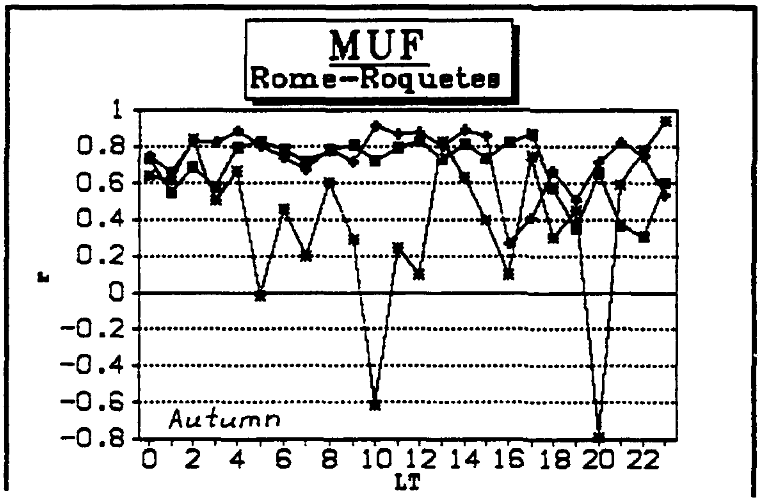
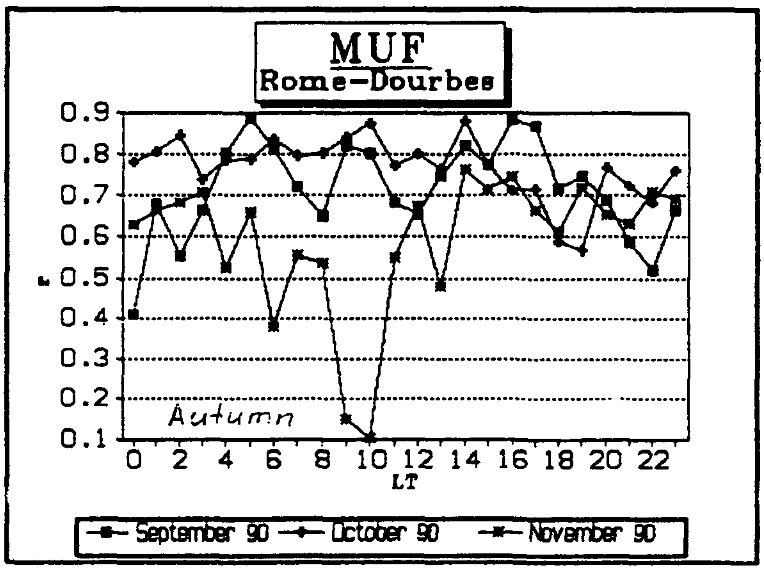


Figure 7d. Diurnal variations of cross correlation coefficient r for the parameter MUF, for the autumn of 1990.





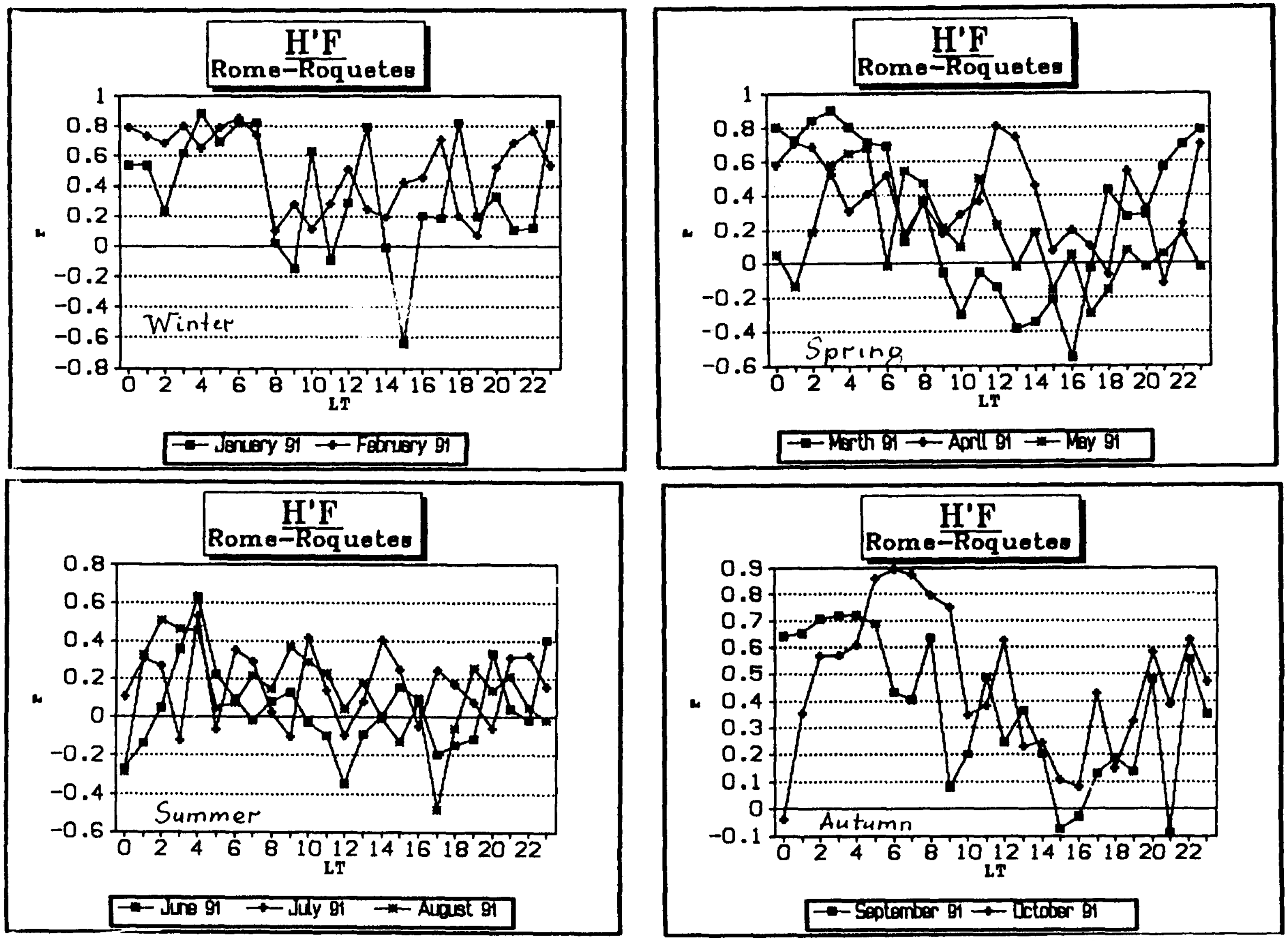


Figure 8a. Diurnal variations of cross correlation coefficient r for the parameter H'F, for various seasons of 1991, sounding stations Rome and Roquetes.

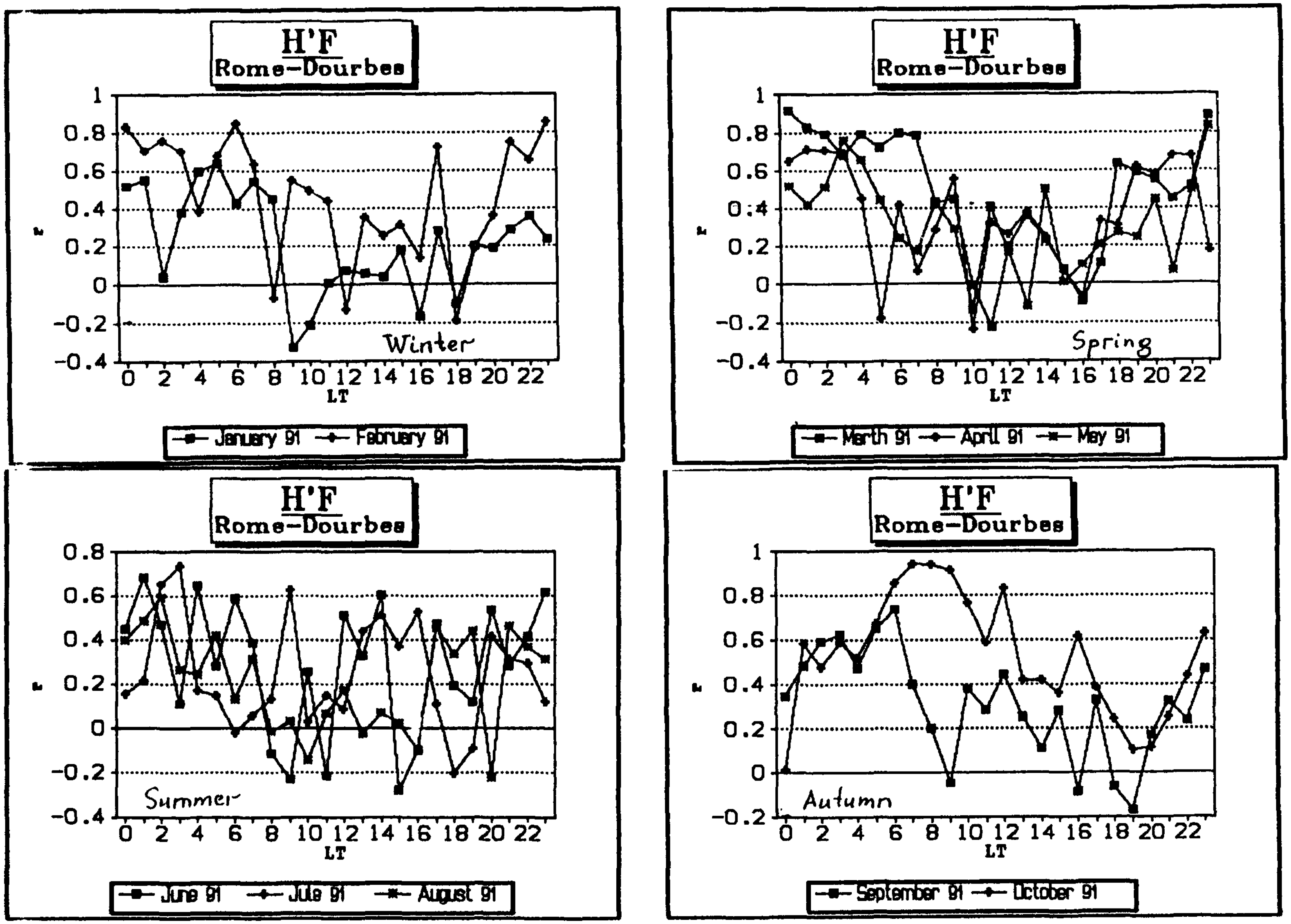


Figure 8b. The same as in Fig. 8a for Rome and Dourbes.

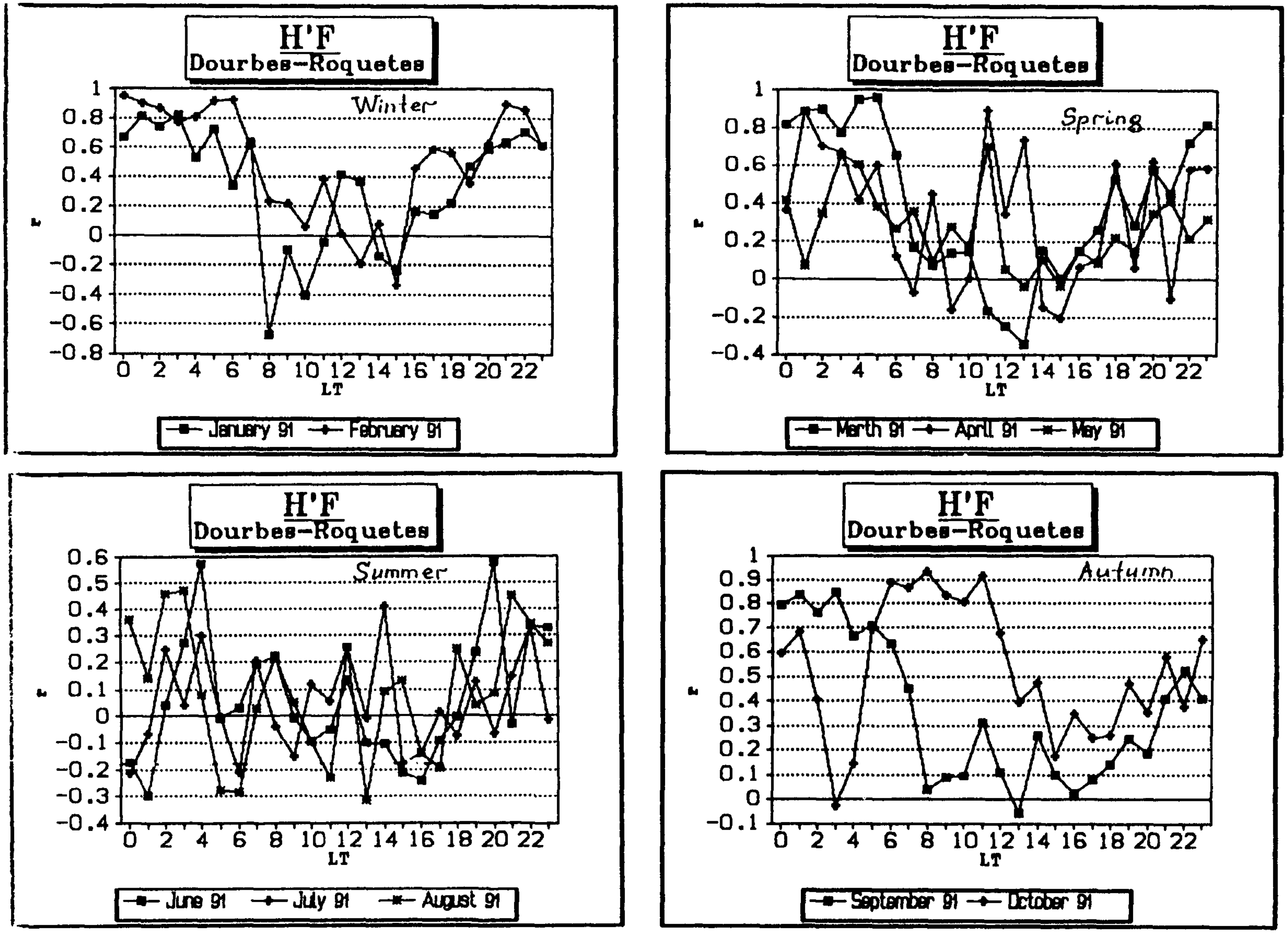


Figure 8c. The same as in Fig. 8a for Dourbes and Roquetes.

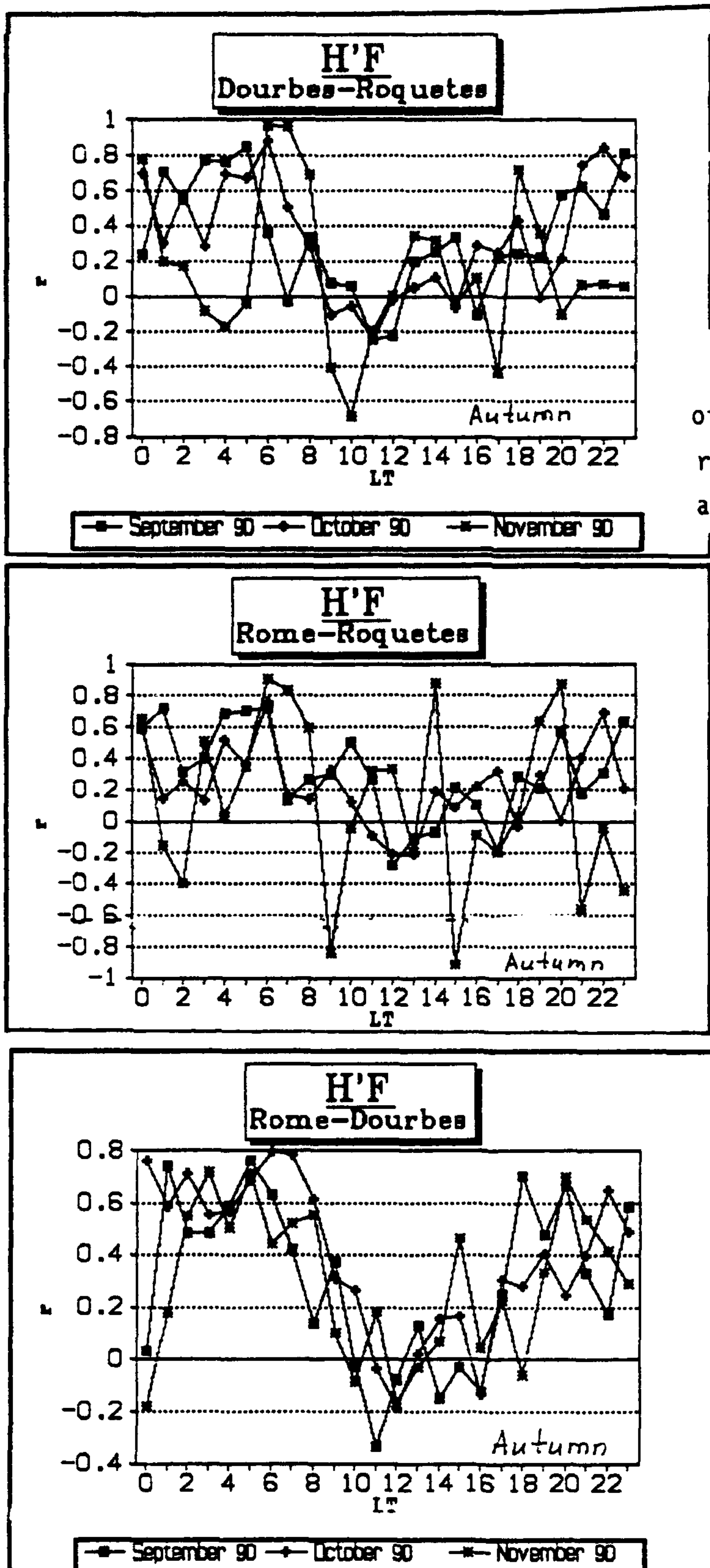


Figure 8d. Diurnal variations of cross correlation coefficient r for parameter H'F, for the autumn of 1990.

It may be seen from Table 1 that the number of cases with $r>0.7$ for critical frequency is higher for stations Rome and Dourbes than for other pairs of stations and is lower for winter than for other seasons of the year.

Correlation coefficients r for f_oF2 (Fig. 5-6) and *MUF* (Fig. 7) are, in general, the same order. They are higher in day-time for spring, summer and autumn and are lower and more irregular in sunset and night periods where r usually is less than 0.4. Values of r for winter period, on the contrary, are less and more irregular in day-time periods. The number of cases with $r > 0.7$ for *MUF* is slightly less in summer than in winter (see Table 2). The curves of r for *MUF* (Fig. 7) are more irregular than for f_oF2.

We note, that the results of statistical analysis depend on the quantity of points considered. If the value of points N is less than 15, the value of r is irregular and low.

Table 2. Season correlation probability $P(r>0.7)$ of *MUF* in percents.

Stations	Summer	Spring	Autumn	Winter
Rome- Roquetes	51.4 37	58.3 42	70.8 34 (48)	70.8 34 (48)
Rome- Dourbes	59.7 43	81.9 59	66.7 32 (48)	39.6 19 (48)
Dourbes- Roquetes	36.1 26	69.4 50	60.4 29 (48)	47.9 23 (48)
Mean	49.1	69.9	66.0	52.8

In summer correlation coefficients *r* for *H'F* are especially more irregular and low than those for f_oF2 and *MUF* (Table 3). The value of correlation coefficient for *H'F* , unlike f_oF2 , is lower in the day-time than at the night-time (Fig. 8).

Table 3. Season correlation probability *P(r>0.7)* of *H'F* in percents.

Stations	Summer	Spring	Autumn	Winter
Rome- Roquetes	 0	18.1 13	16.7 8 (48)	29.2 14 (48)
Rome- Dourbes	2.8 2	19.4 14	14.6 7 (48)	18.8 9 (48)
Dourbes- Roquetes	 0	34.7 25	22.9 11 (48)	31.3 15 (48)
Mean	0.9	24.1	18.1	26.4

These results show that the correlation of *H'F* between various points depends strongly on the variations of electron density below the maximum of *F2* layer in the layers *F1*, *E*, E_{spred}. Electron concentration in these layers can be significally different at the distances of the order of 1000 km specially in day time, when electron concentration in *E* and *F1* layers is rather large (day, summer). It produces the differences in *H'F* at various stations.

Mean for all stations season probability *P(r>0.7)* for parameters f_oF2, *MUF* and *H'F* are given in Table 4.

Table 4. Mean season probability $P(r>0.7)$ for f_oF2, *MUF*, and *H'F*.

Parameter	Winter	Spring	Summer	Autumn
f_oF2	41.6	65.2	63.9	66.7
MUF	52.8	69.9	49.1	66.0
H'F	26.4	24.1	0.9	18.1

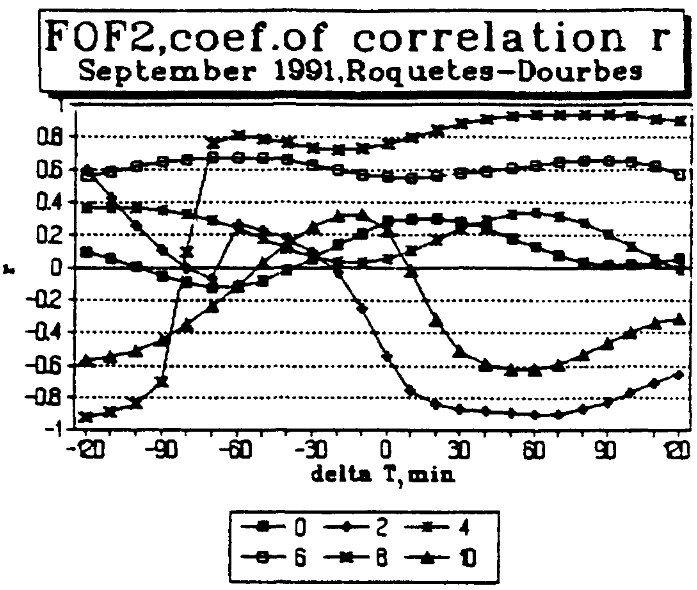
4.5. Dependence of correlation coefficient on the difference in time between stations

The comparison of the coefficients of correlation calculated for the same UT at both stations (see Third Interim Report) with coefficients calculated for the same LT at both stations (see Forth Interim Report) shows that, in general, the values, taken in LT, are higher than the values, taken in UT. Nevertheless, this fact is not always observed. To review this the variations of r, as a function of the difference in time Δt between stations, were calculated. They are shown in Fig. 9. Here $\Delta t = t_1 - t_2$; t_1 is LT=UT for station Roquetes, they are given below the picture; t_2 is UT for station Dourbes. The value of t_1 is constant for every curve in Fig. 9, the value of t_2 is changing. The value Δt equal to -50 minutes corresponds to the same LT at both stations or t_1=UT=LT for Roquetes. It is seen that the coefficient of correlation very often does not depend on the difference in time between stations.

These results do not seem to be clear enough and should be studied in future.

5. GRADIENT ANALYSIS

Gradient analysis of the f_oF2 has been studied by Kerbly and Kovalevsky /15,16/. Two charts of longitudinal and latitudinal gradients of f_oF2 from /15/ are shown in Fig. 10. Kerbly and Kovalevsky /15,16/ concluded that maximum longitudinal gradients



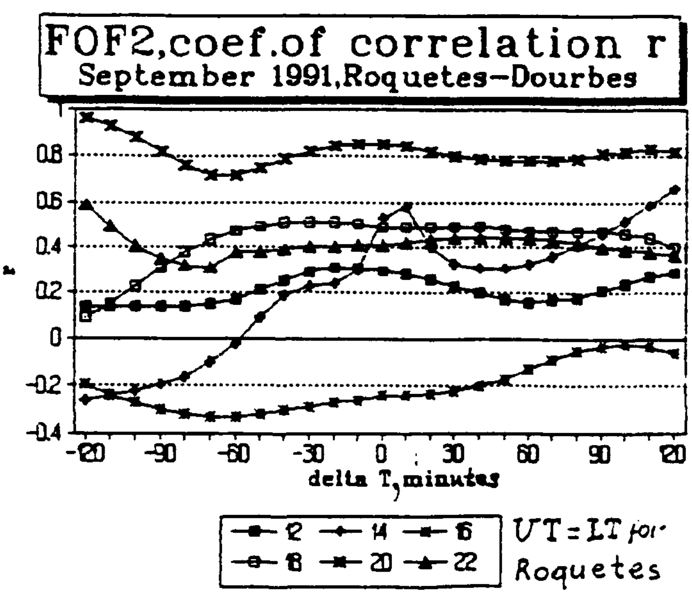


Figure 9. The dependence of cross correlation coefficient r as a function of time difference between Dourbes and Roquetes.

(up to 0,4 MHz/100 km) are observed in sunrise hours (Fig. 10b). The values of gradients corresponding to high solar activity is three to four times higher than those corresponding to the low activity. Maximum latitudinal gradients are observed during the day and evening time in winter (Fig. 10). Monthly median gradients can sometimes be 2-3 times higher or lower than the individual ones.

Longitudinal gradients of the ionospheric parameters $P_{i\varphi}$ can be considered to consist from two parts: temporal (longitudinal) P_{it} and eigen longitudinal P_{ie} gradients:

$$P_{i\varphi} = P_{it} + P_{ie} = \Delta P_{it}/\Delta t + \Delta P_{is}/\Delta s. \tag{9}$$

The mean longitudinal gradient P_{it} can be received using diurnal variation of the considered parameter at any station or some stations for some days or for one month. Gradient $P_{ie} = \Delta P_{is}/\Delta s$ can be calculated evaluating the difference between parameters P_i for two stations at the same Local Time at each station and then averaging these differences for some days or for month. These stations must be located along the same latitude.

To determine latitudinal gradients we need to have ionospheric data from the stations with the same longitudes and various latitudes. Because all three considered stations have different longitudes only spatial gradients between stations may be estimated. These gradients can be calculated using the differences between parameters at two stations in the same moment of time or at the same Local Time.

5a. Temporal (longitudinal) gradients and RMS

Mean time derivatives or temporal gradients ($\bar{x}_t'$) of the f_oF2 for each month and station considered are given in Fig. 11 for different seasons. They were calculated as follows: first the gradients for each hour and for every day-night of the month considered were estimated and then they were averaged to obtain

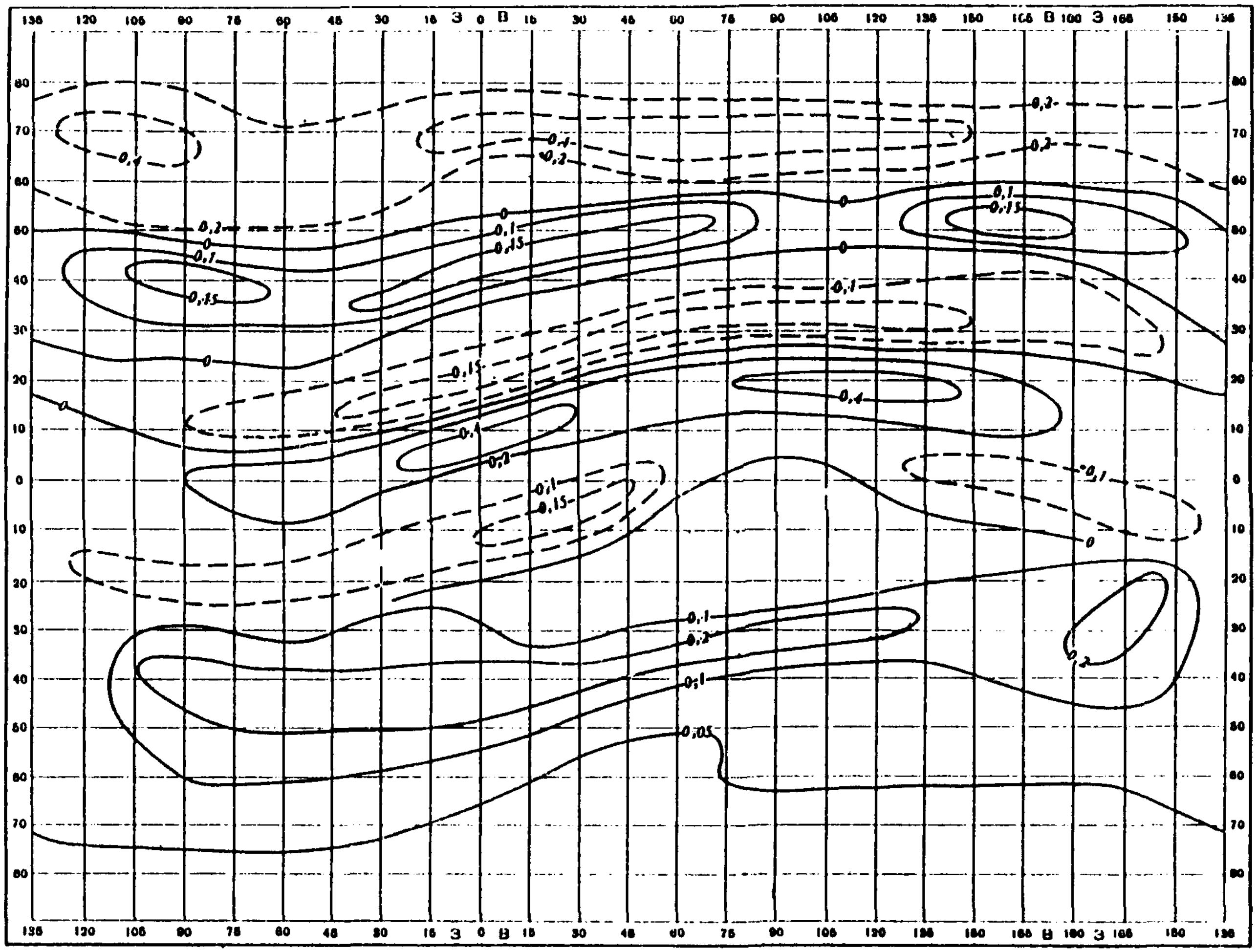


Figure 10a. The chart of latitudinal gradients of foF2 in MHz/100 km, January 1958, noon.

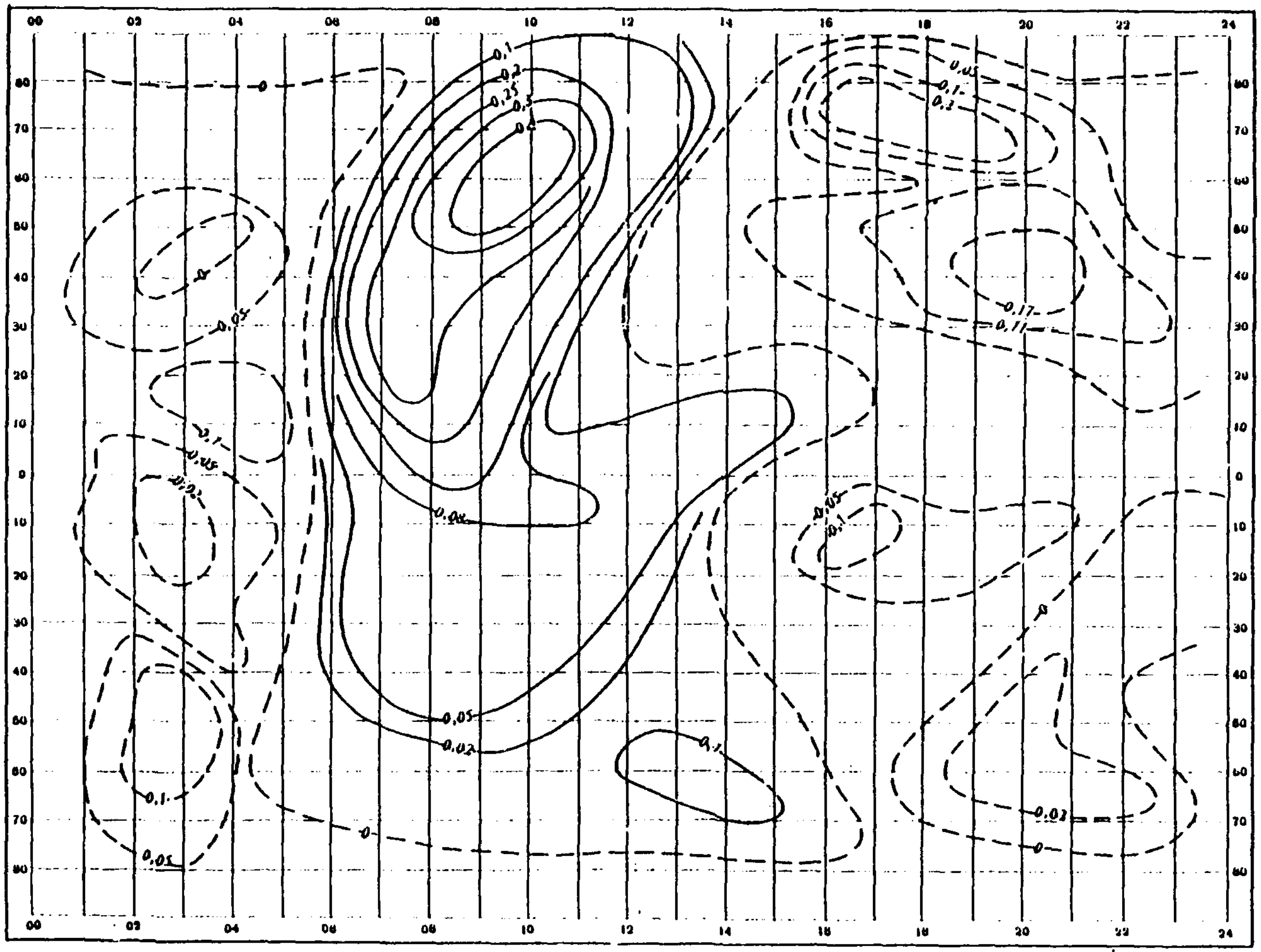


Figure 10b. The chart of longitudinal gradients of foF2 in MHz/100 km, January 1958. Hours of Local Time are plotted on the abscissa.

mean temporal gradients. Absolute values of these gradients are increasing at sunset and sunrise. In summer they are usually lower than in other seasons. Maximum twilight values are of the order 2 to 3 MHz/hour or MHz/1666,7 km (one hour corresponds to 1666,7 km) or 1.2 to 2 MHz/1000 km. This maximum is two or one and a half times less than it was in 1958 /16/.

Median temporal gradients are given, as an example, for station Dourbes in Fig. 11c. Hourly medians have been used estimating these gradients. One can see that the differences between median and mean gradients are not significant - less than 0.5 MHz/1666,7 km.

The RMS of mean temporal (longitudinal) gradients are shown in Fig. 12. It is seen that they are irregular and, in average, they are of the order 0.5-1 MHz/1666,7 km, i.e. 3-4 times less than temporal gradients. In winter RMS are higher in the day-time, in summer - in the night-time and sunrise-time.

Eigen longitudinal gradients P_{le} can be calculated only using two stations from considered three stations - Rome and Roguestes, since these two stations have very close latitudes: the difference between their latitudes is only one degree. These gradients will be discussed together with spatial gradients.

5.b. Spatial gradients and RMS

Spatial gradients for each of two stations from three ones were estimated taking into account the difference in distances S (2) between stations. While gradients were estimated, the values of the parameters at both stations were chosen in the same Local Time.

Mean spatial monthly gradients of critical frequency f_oF2 are assigned in Fig. 13 and Appendix 3.

The gradients between Rome and Roquetes vs LT can be

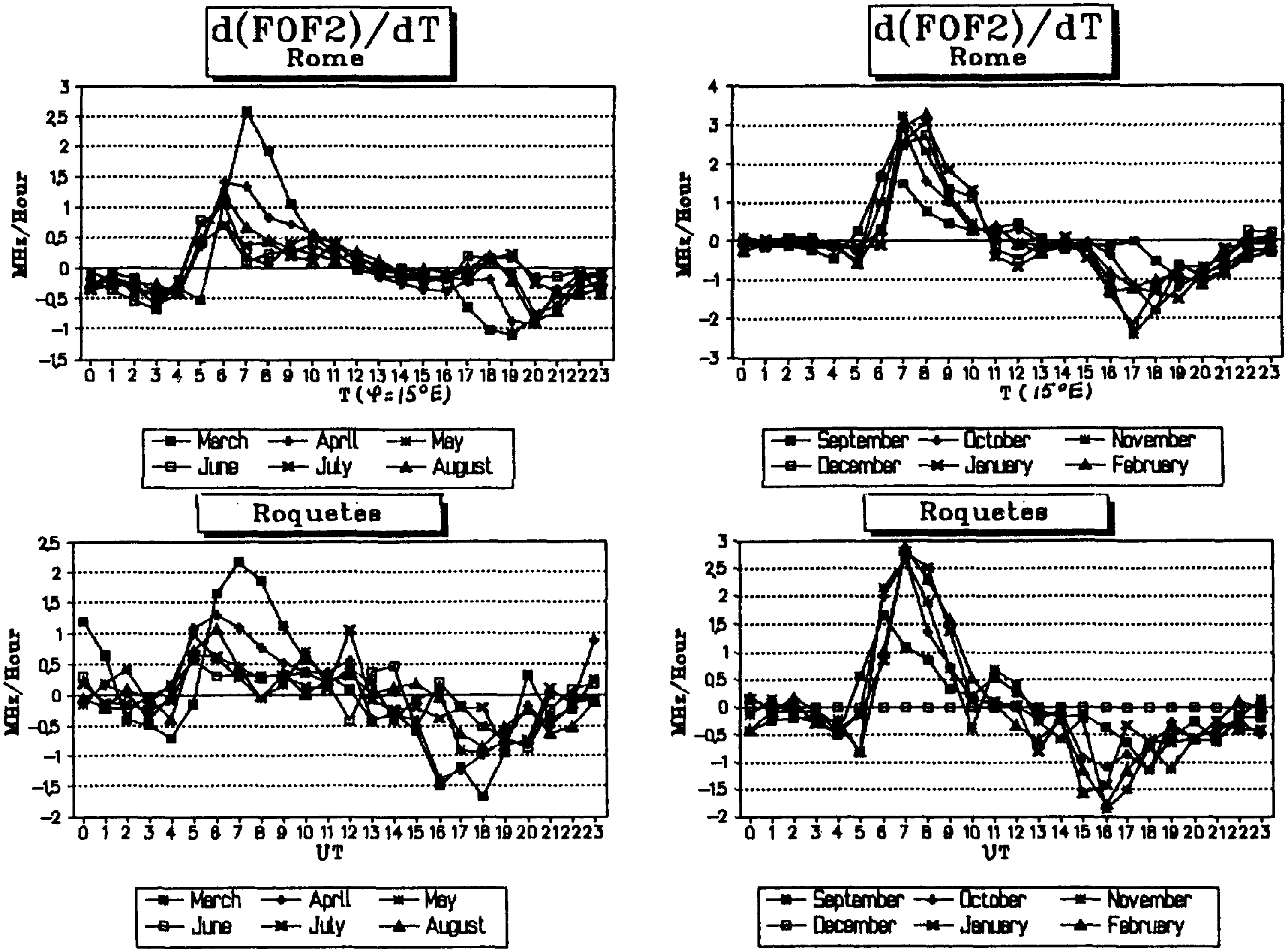
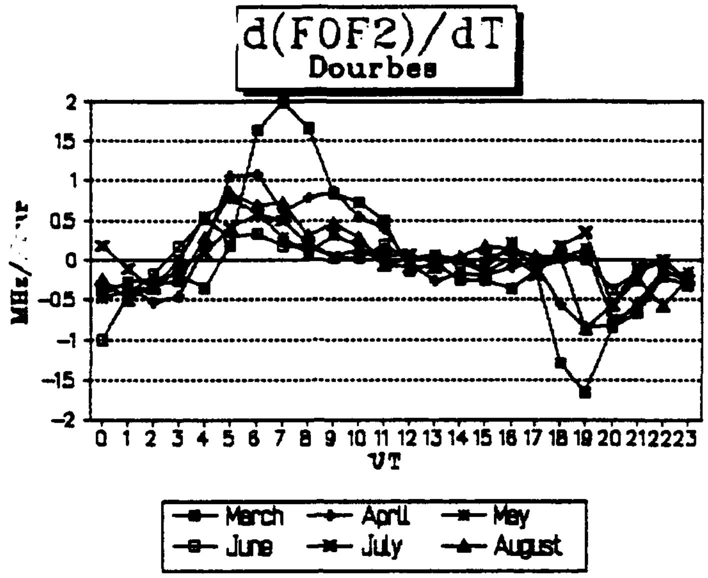


Figure 11a. Longitudinal (temporal) gradients of critical frequency foF2 (x_1') from March 1990 to February 1991 in MHz/hour or MHz/1666.7 km, stations Rome and Roquetes.



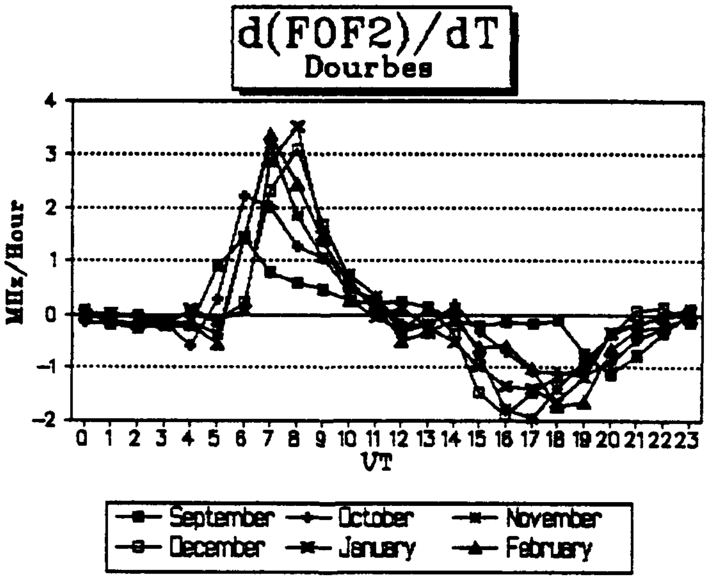
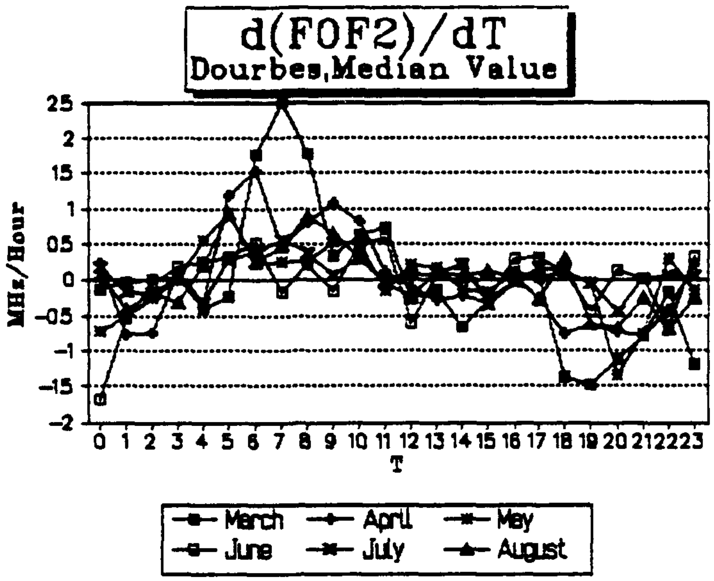


Figure 11b. The same as in Fig. 11a, station Dourbes.



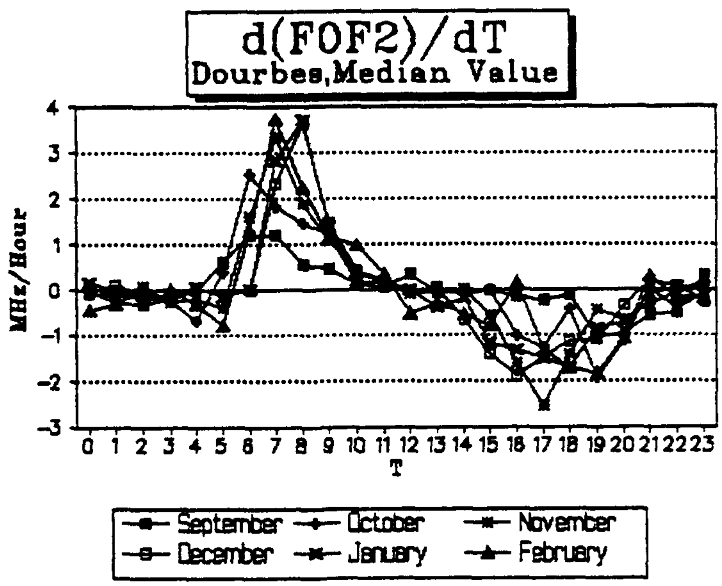


Figure 11c. Median temporal gradients of foF2 in MHz/hour or MHz/1500 km, station Dourbes.

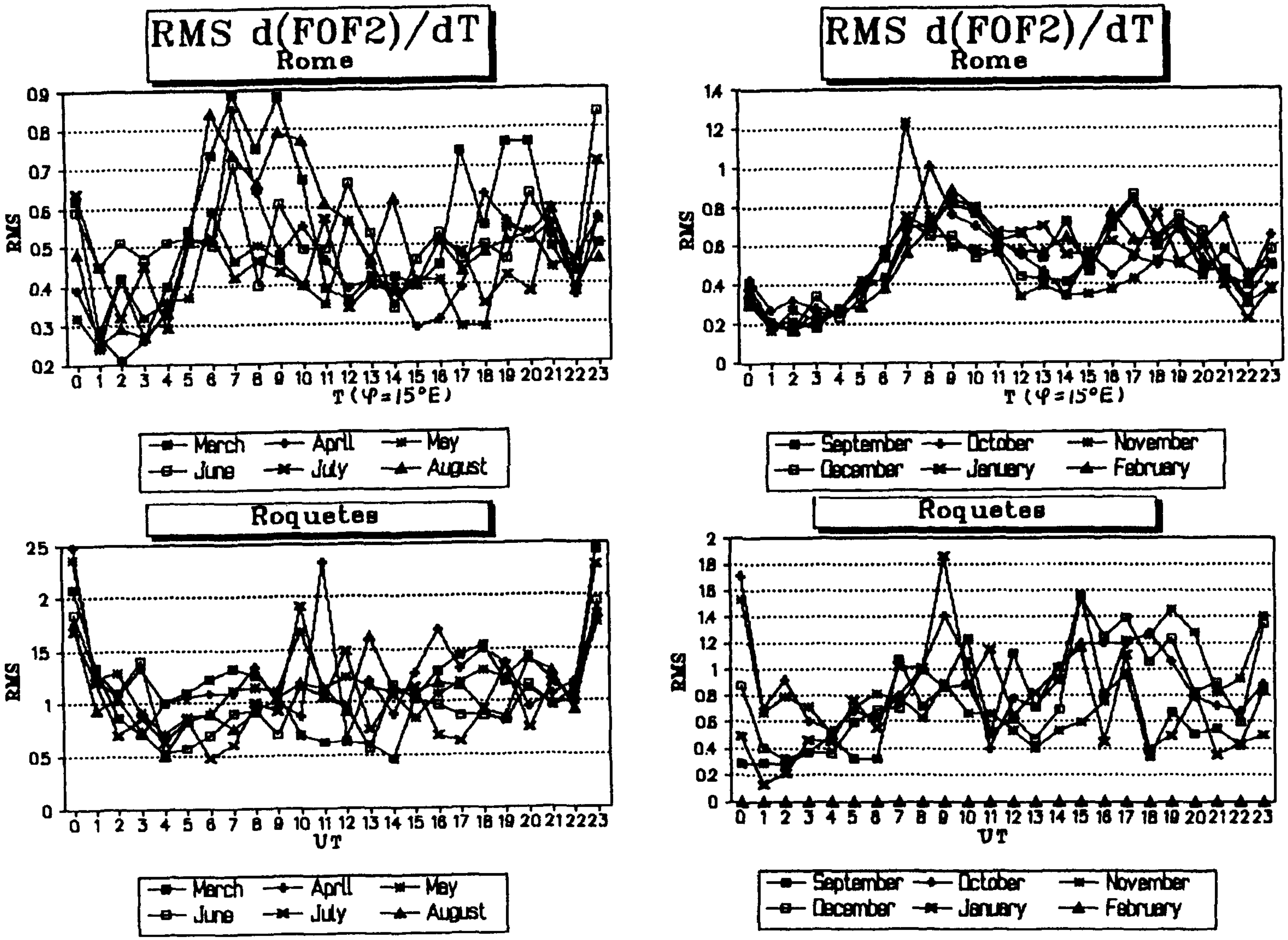
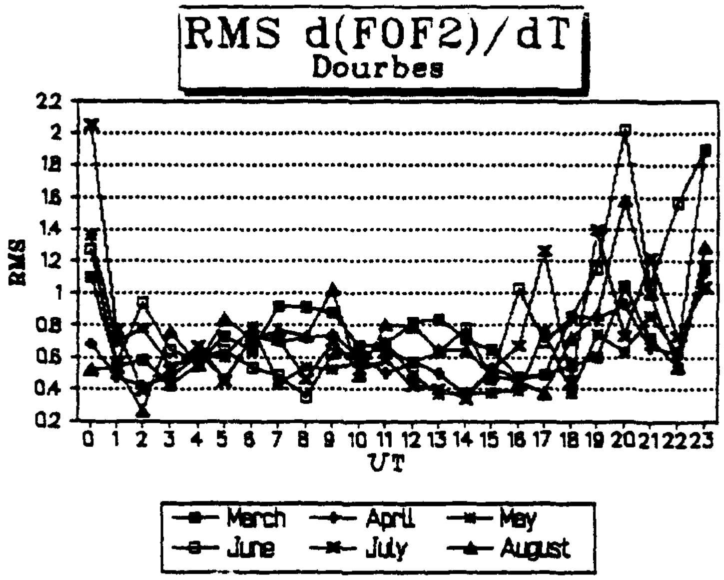


Figure 12a. RMS of temporal gradients of critical frequency foF2 from March to February 1991 in MHz/hour or MHz/1666,7 km, stations Rome and Roguetes.



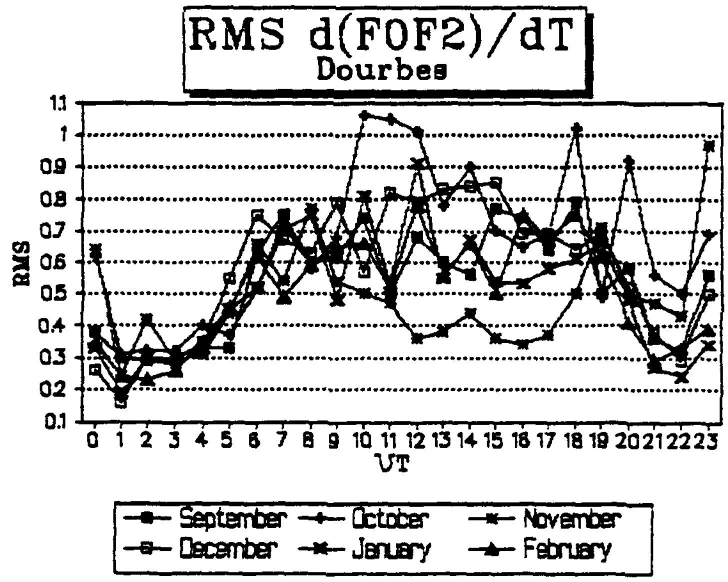


Figure 12b. The same as in Fig. 12a, station Dourbes.

considered as eigen longitudinal gradients since the latitudes of these stations are close to each other (40.8 and 41.8 degrees). They are shown in Fig. 13a. It is seen that, in spite of temporal gradients (Fig. 11), they are, generally, positive. The maximum of these gradients is observed, in general, during sunsets and after sunset hours at all seasons of the year. Their value is of the order from 2.0 to 3.5 MHz/1000 km, i. e. on 70 % more than the maximum values of longitudinal (temporal) gradients.

Spatial gradients between Rome and Dourbes and Dourbes and Roquetes are shown in Fig. 13b and 13c. They include both latitudinal and longitudinal gradients.

The gradients vs LT for Dourbes and Roquetes (Fig. 13c) are similar to the gradients between Rome and Roquetes (Fig. 13a). However, positive maximum of these gradients in summer and autumn are in two times and in spring on 30 % less than those for Rome and Roquetes. Besides, they have a large negative part with absolute value somewhat less than positive maximum.

Gradients between Rome and Dourbes (Fig. 13b) are irregular, mostly positive, and vary slightly with the changes of the season.

RMS of mean spatial gradients are provided in Fig. 14. They are of irregular type and, in average, set between 0.6 and 1.2 MHz/1000 km. However, they can be in 1,5-2 times less or more than these average values. In most cases RMS is on 30-60 % less than the value of mean spatial gradients. However, they can be of the same order.

Median spatial gradients of critical frequency have the same form as mean spatial gradients (Fig.15a,b). But, they often differ significantly from mean spatial gradients in magnitude: sometimes on 20-30 % (Fig. 13d). This is because the mean gradients in Fig. 13 were calculated in a following consequence: the gradients for every hour of LT and every day of the month were calculated first

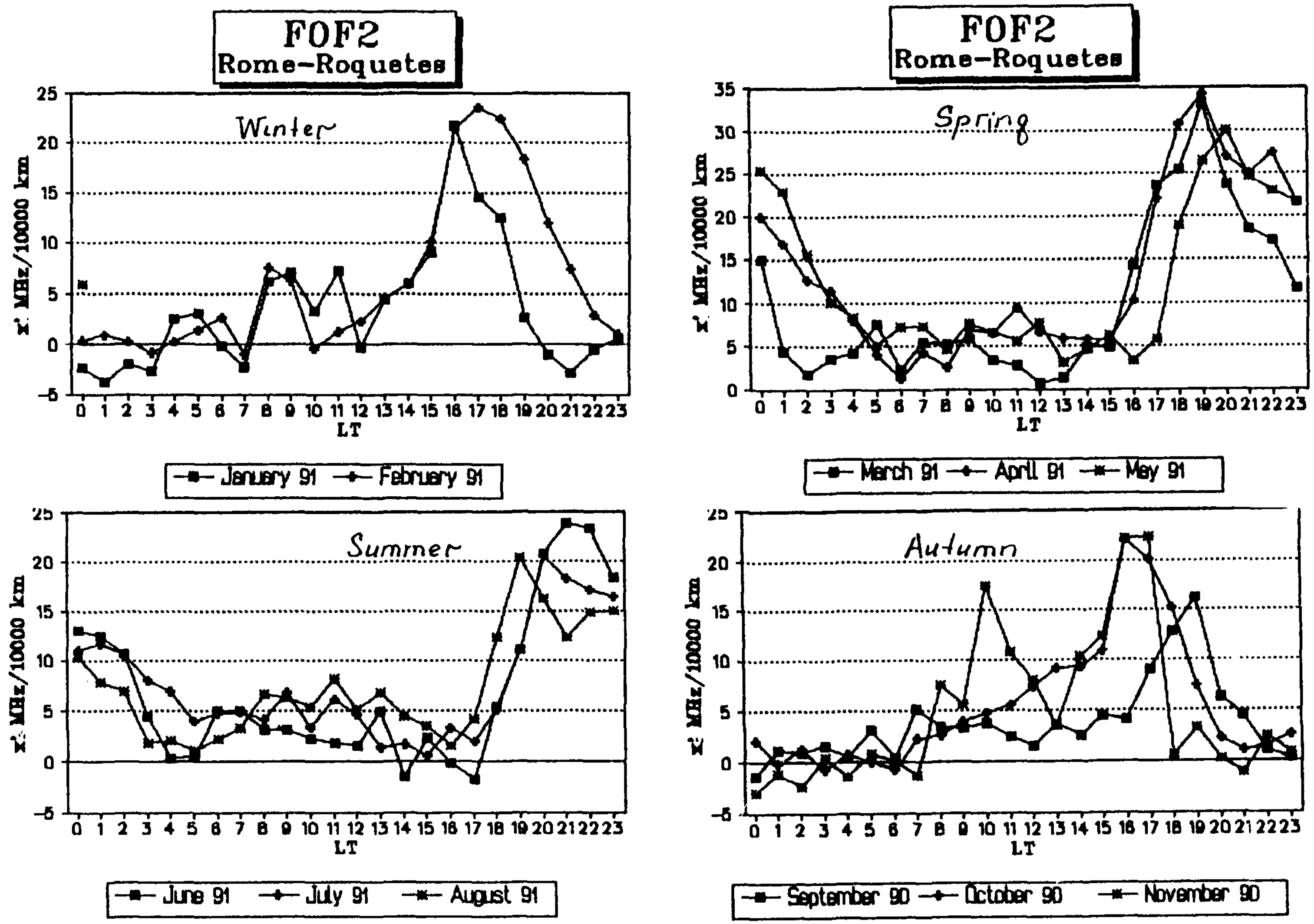


Figure 13a. Mean spatial gradients of foF2 (x_s') in MHz/10000km between stations Rome and Roquetes versus LT for every month from September 1990 to August 1991.

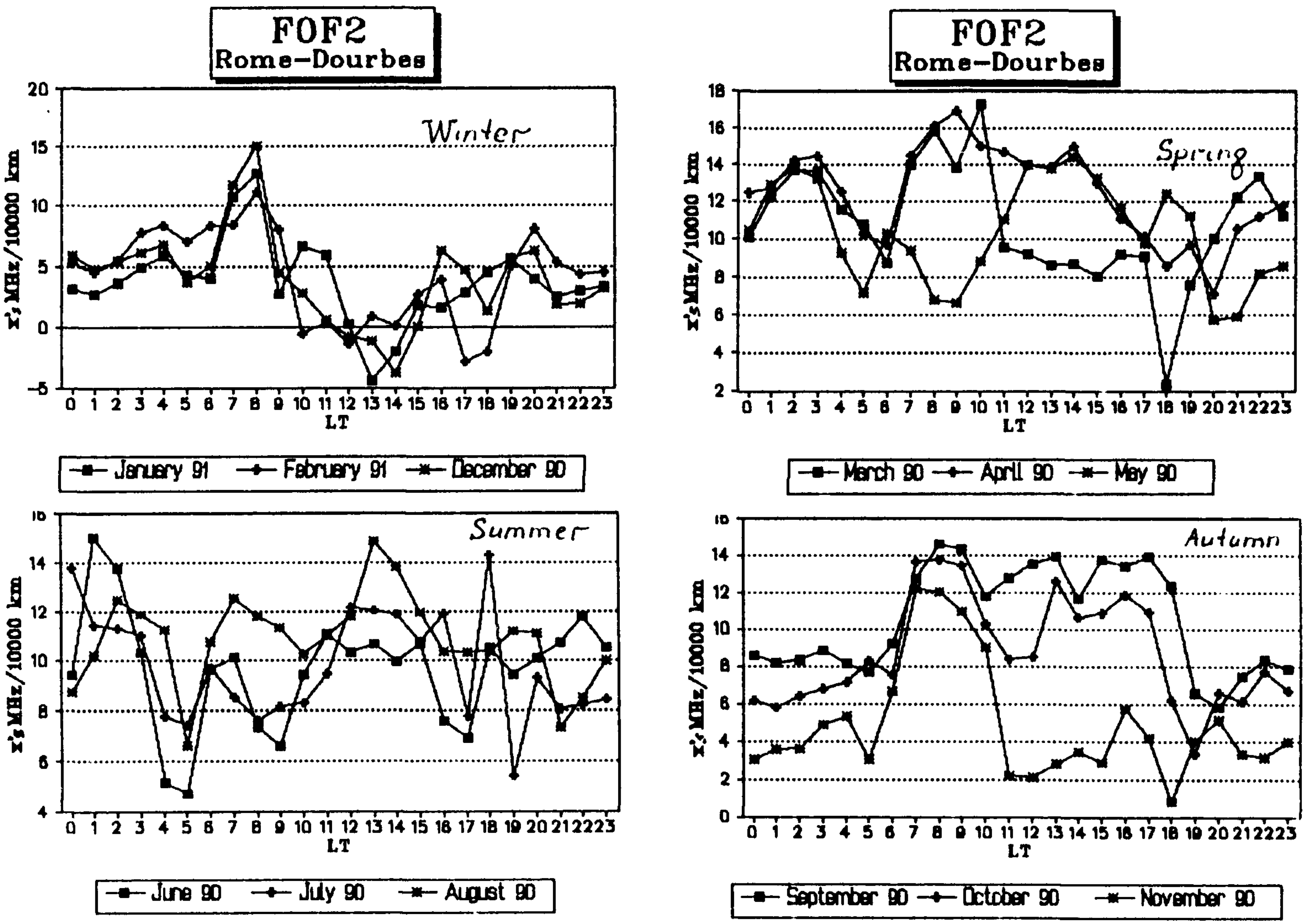


Figure 13b. The same as in Fig. 13a for Rome and Roquetes.

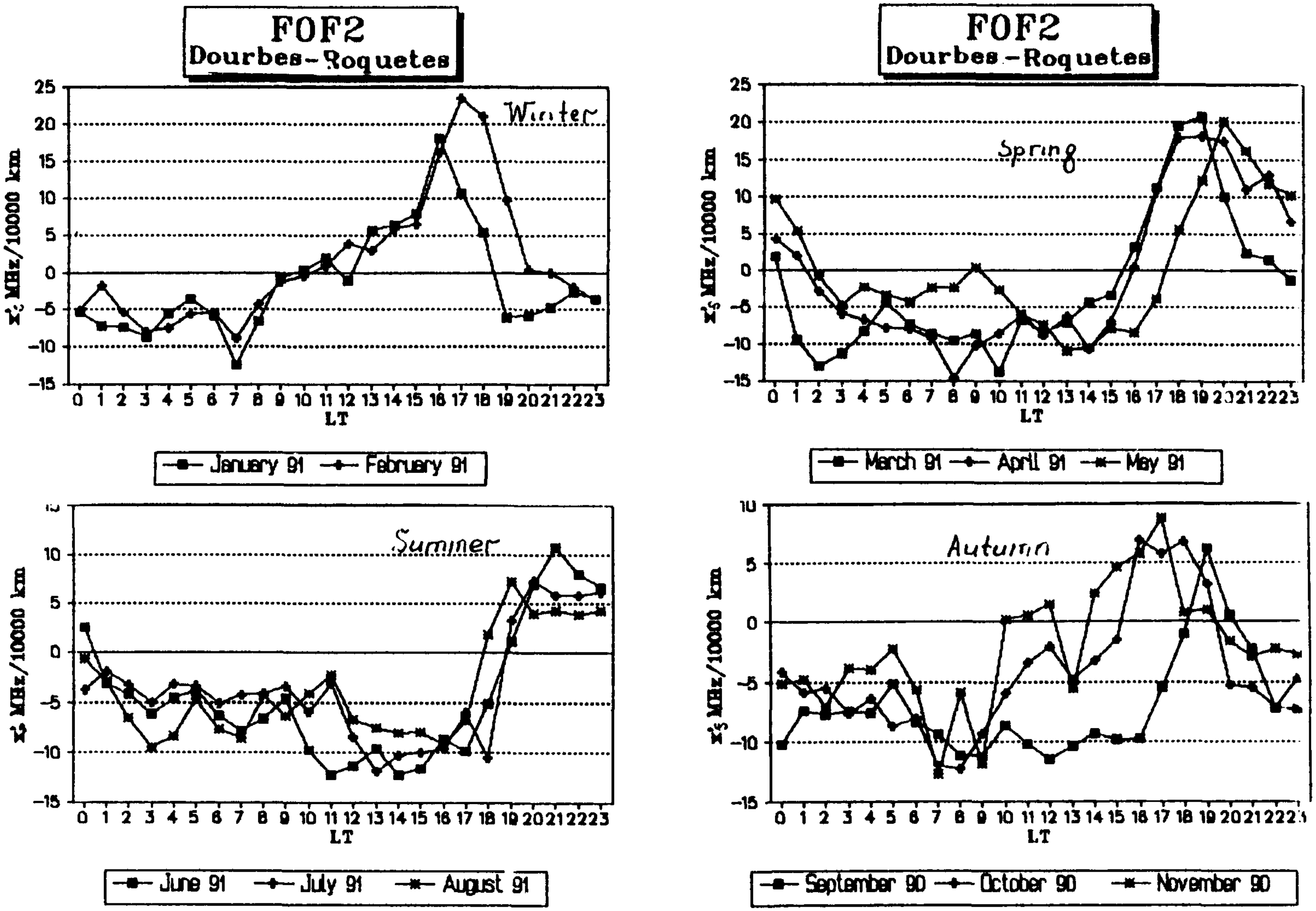


Figure 13c. The same as in Fig. 13a for Roquetes and Dourbes.

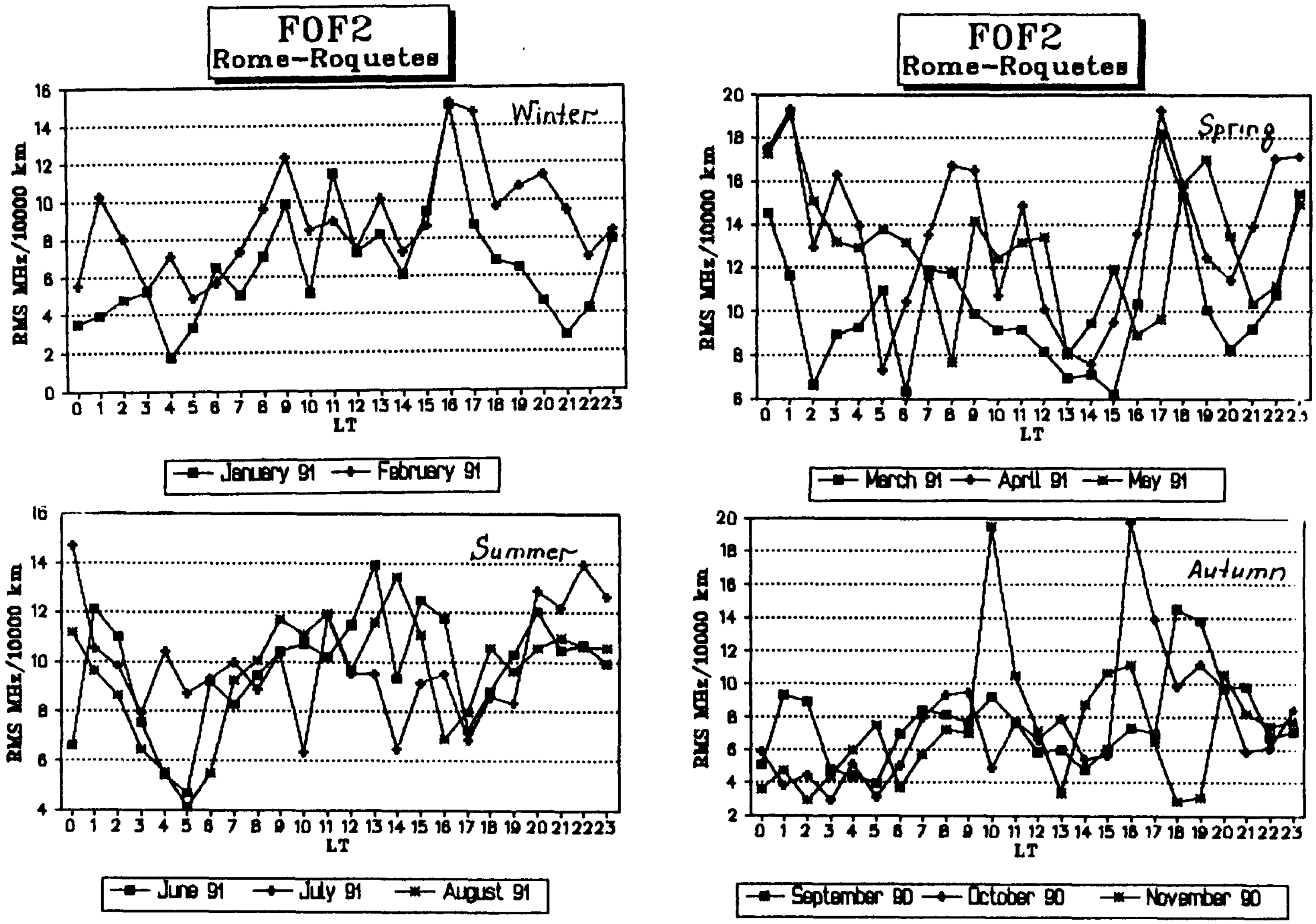


Figure 14a. RMS of mean spatial gradients of foF2 in MHz/10000km between stations Rome and Roquetes versus LT for every month from September 1990 to August 1991.

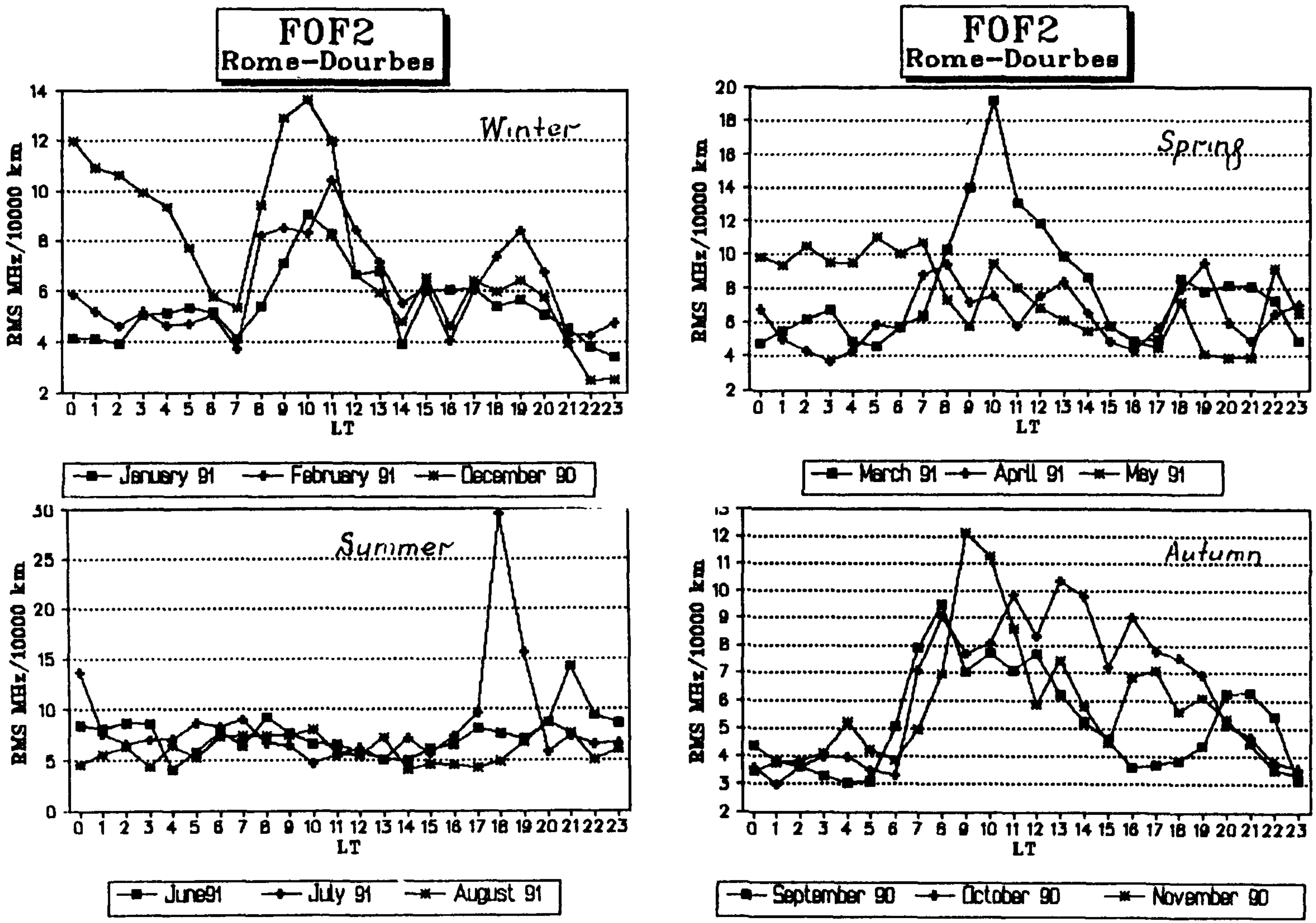


Figure 14b. The same as in Fig. 14a for Rome and Dourbes.

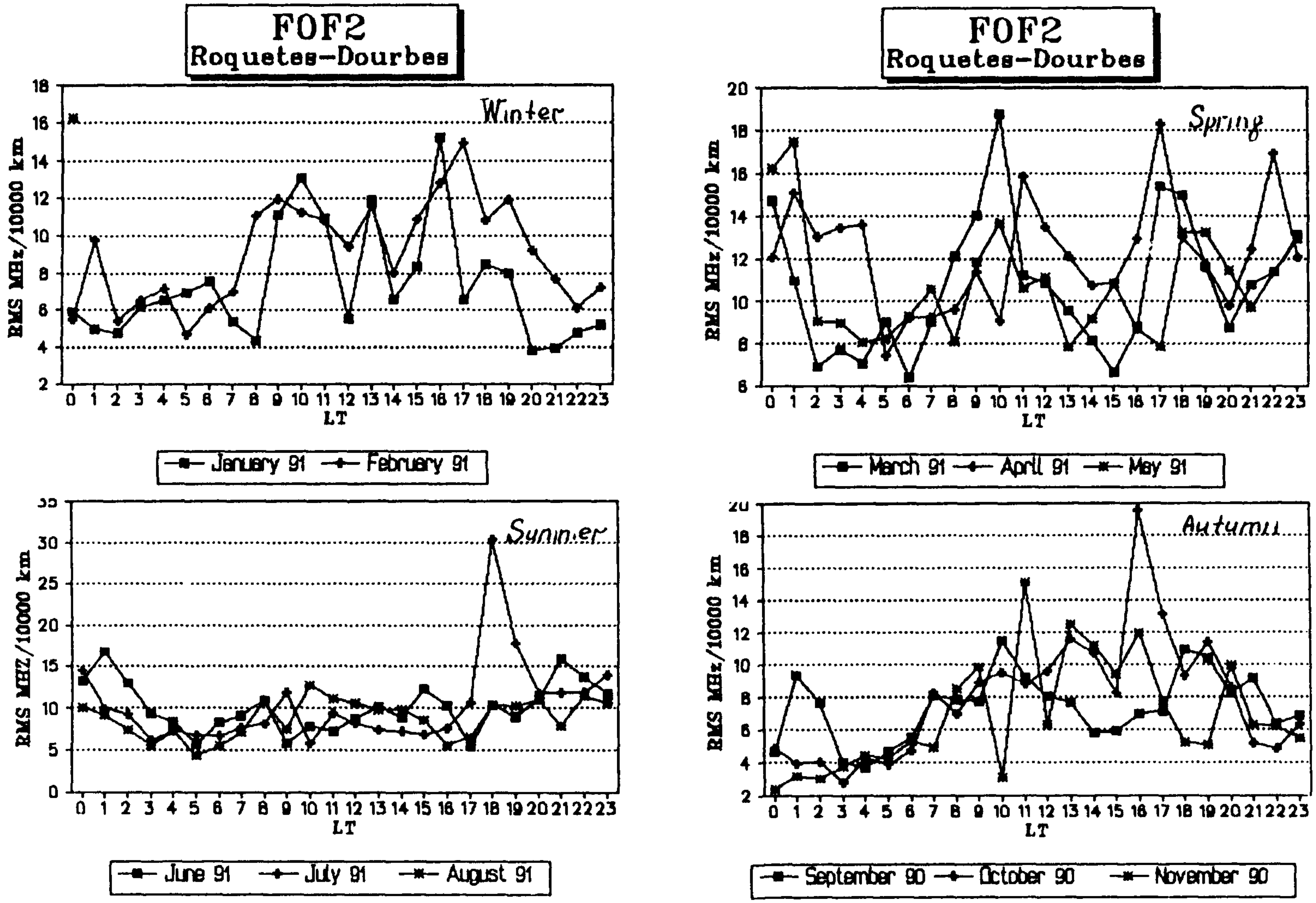


Figure 14c. The same as in Fig. 14a for Roguetes and Dourbes.

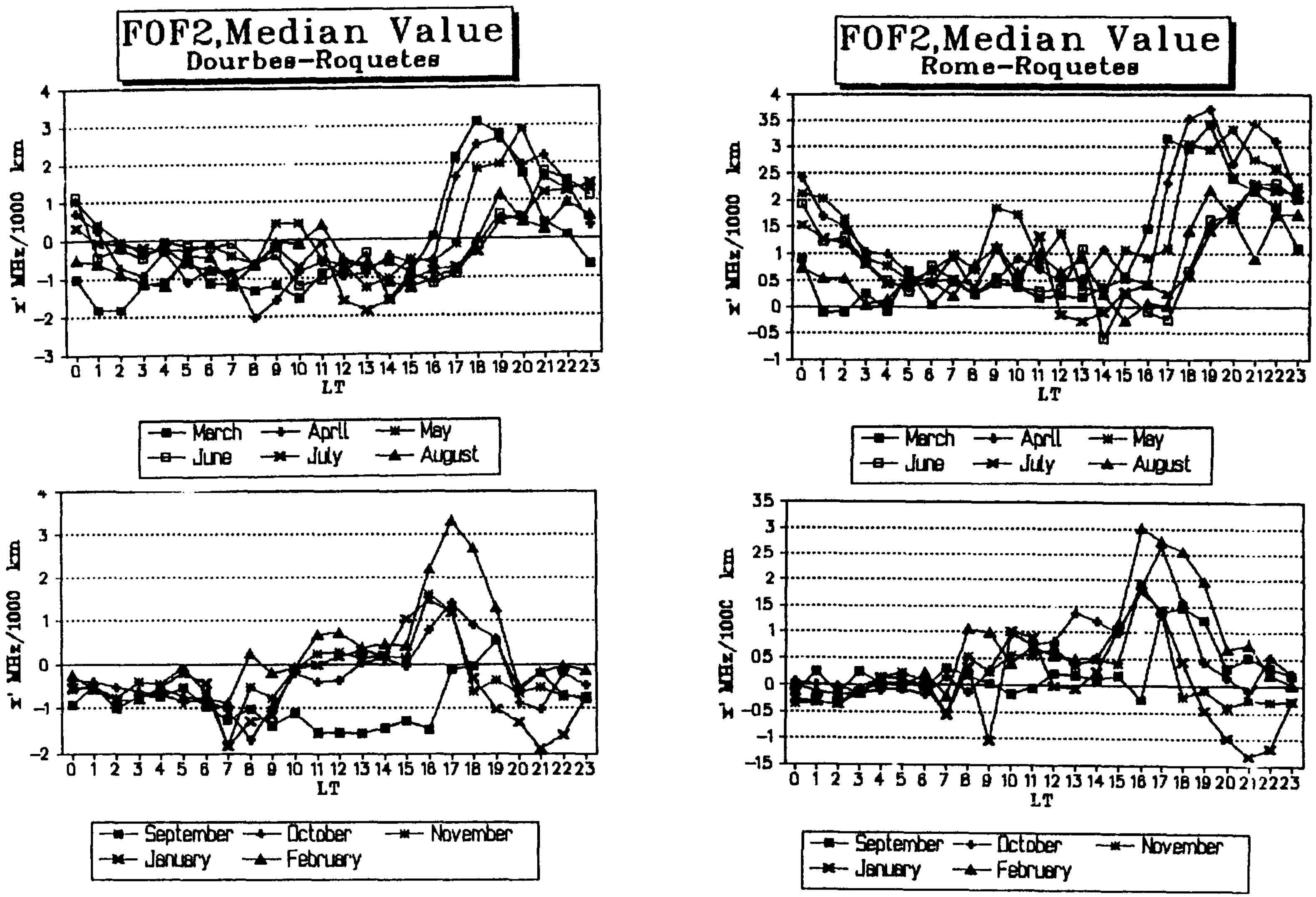


Figure 15 a. Median spatial gradients of foF2 in MHz/1000 km between stations Rome and Roguetes, Dourbes and Roguetes.

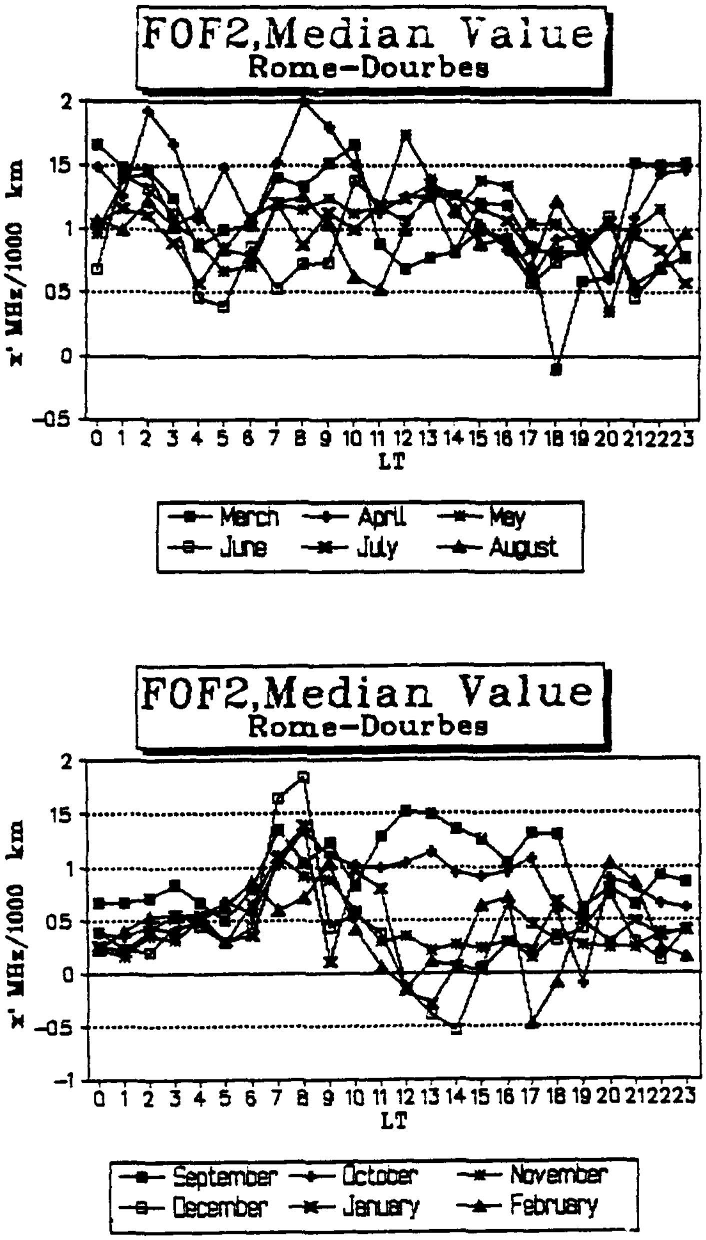
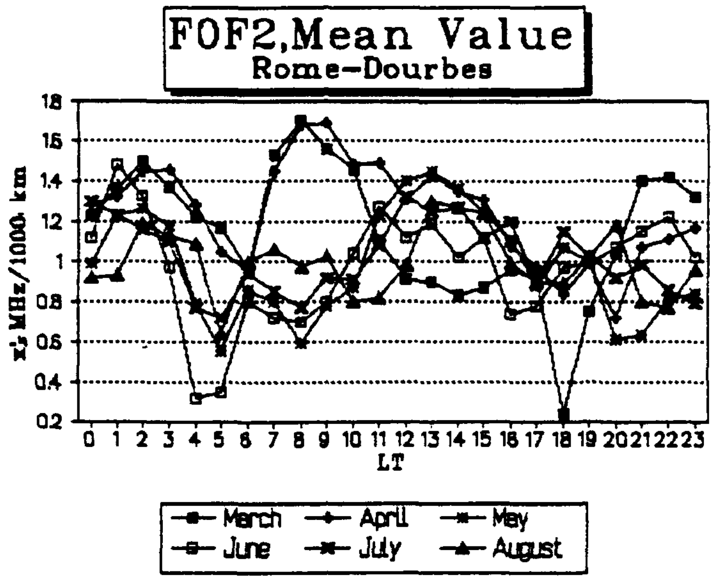


Figure 15b. The same as in Fig. 15a for Rome and Dourbes.



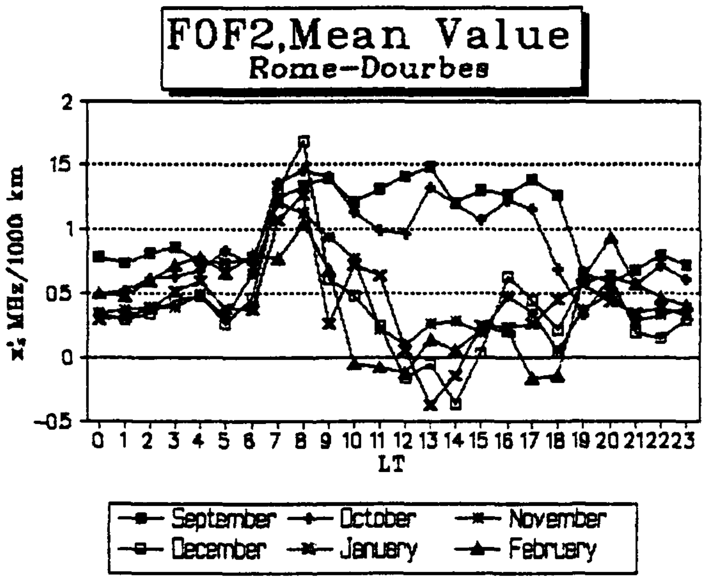


Figure 15c. Spatial gradients of mean foF2 (x_s') in MHz/1000 km between stations Rome and Roquetes versus LT for every month from September 1990 to August 1991.

and only after that using these values the mean gradients were evaluated. Spatial gradients of mean values, calculated in other order, are close to median gradients and mean gradients in form (Fig. 15c), but can be different in magnitude on 20-40 %. They were estimated using mean values of f_oF2.

6. CONCLUSIONS AND RECOMMENDATIONS

Monthly correlation and gradient characteristics of selected ionospheric parameters using arrays of data from three European stations have been estimated for the period in one year. These work was performed for creation of a predicted ionospheric model for HF radio communications when these ionospheric parameters are given in real time by sounding station, located in a central point of the radio wave propagation area.

During this work we produced:

1. New array of ionospheric parameters from three European stations recorded in one format which can be easily used to produce any mathematical analysis.
2. TURBO-PASCAL program created for viewing and printing ionograms from diskettes of these stations.
3. Special interpolation procedure which gives a possibility to receive any parameters at any needed time and conduct the mathematical analysis in LT.
4. Monthly correlation coefficients of the ionospheric parameters f_oF2, $H'F$ and $MUF(3000)F2$ in hourly intervals in LT for the year of high solar activity (mean sport number R=140).
5. Mean monthly temporal and spatial gradients ofcritical frequency f_oF2 for each two stations from all three ones, for the period in one year.
6. RMS of mean monthly temporal and spatial gradients of f_oF2.

7. Mean and median values of all parameters considered and their RMS.
8. Median monthly temporal and spatial gradients of critical frequency.
9. Monthly spatial gradients of mean parameters of critical frequency.

6.1. Conclusions

1. Coefficients of correlation depend on the pair of stations considered, on the season of the year and the time of day. They are different for various ionospheric parameters.
2. Correlation of critical frequency is lower in winter and at sunset hours (see Table 1). The highest correlation belongs to the stations Rome and Dourbes, the lowest- to the stations Rome and Roquetes. Mean probability of the cases with the coefficient of correlation $r > 0.7$ is of the order 60 %.
3. Correlation of usable maximum frequency *MUF(3000)* is, in general, of the same order as correlation for critical frequency (Table 2). However, in spite of correlation for f_oF2 it is a little bit lower in summer than in winter.
4. Correlation of *H'F* is very low especially in summer (Tab. 3-4) and in day-time. Mean probability $P(r>0.7)$ is of the order 17 %.
5. Temporal (longitudinal) gradients are of maximum magnitude, 1.2-2 MHz/1000 km, during twilight hours in September- March.
6. Spatial (longitudinal-latitudinal) gradients depend on the pair of stations, the season of the year and the time of day. They are of the same order of magnitude as temporal gradients.
7. The gradient analysis have been not completed. It is necessary to make attempts to separate spatial

gradients in two parts - longitudinal and latitudinal.

6.2. Recommendations

1. It is necessary to evaluate corrected prediction ionospheric model analytically first and then determine what ionospheric parameters are important and required for this model.
2. A complex of computer programs created can be applied to correlation analysis of ionospheric parameters both for other parameters and for different geophysical conditions. Such analysis should be done, for instance, for the parameters *M(3000)*, f_oE, f_oF1 and others important ionospheric parameters for creation of the prediction model.
3. Gradient analysis should be continued and real longitudinal and latitudinal gradients could be obtained.
4. It can be recommended to verify obtained correlation coefficients and gradients for the prediction of ionospheric parameters and their comparison with real parameters from sounding stations.

Analysis provided have shown that it is not enough to have ionospheric information from three sounding stations. Correlation coefficients and gradients depend also on the distance between stations and on coordinates of these points. That why it is desirable to include more sounding stations in the analysis.

REFERENCES

1. Raver, K., International Reference Ionosphere-IRI-79, *Rep. UAG-82*, edited by I.V. Lincoln and R. Conkright, Wold Data Center A, Boulder, Colo, 1981.

2. Raver, K., 1991, Data needed for an analytical description 6 the electron density profile, *Adv. Space Res.*, **11**,No 10, pp.(10)57-(10)65.

3. Bradley, P.A. and I.R.Dudeney, 1973, A simple model of the vertical distribution of electron concentration in the ionosphere, *J. of Atmosph. and Terr. Phys.*, **35**, pp. 2131-2146.

4. Dudeney, J. R., 1978, An improved model of the variation of electron concentration with height in the ionosphere, *J. of Atmos. and Terr. Phys.*, **40**, pp. 195-203.

5. Rush, C.M., 1986, Ionospheric radio propagation models and predictions -A mini review, *IEEE Trans. Antennas Propag.,AP-34*, 1136-1145.

6. Gurevich, A.V., A.V. Israitel, T.N. Soboleva, E.E.Tsedilina, I.A. Tushentsova, 1981, *Global analytical equinoctial model of electron concentration of the ionosphere EMI-81*, IZMIRAN, preprint 49, 35p., Moscow.

7. Gurevich, A.V., and E.E. Tsedilina, 1985, *Long distance propagation of HF radio waves*, Springer Verlag, Berlin, 344p.

8. Reinish, B.W., 1986, New techniques in ground-based ionospheric sounding and studies, *Radio Science*, **21**, 331-341.

9. Reinisch, B.W. and X. Huang, 1983, Automatic calculation of electron density profiles from digital ionograms, 3. Processing of bottom side ionograms, *Radio Science,* **18,** 477-492.

11. Reinisch B.W., R.R. Gamache and L.G. Bossy, 1990, Ionospheric characteristics for IRI in real time. *Adv. Space Res.*,**10**,No 8, 25.

12. Rush, C.M., and D.C. Miller, 1973, A three- dimensional ionospheric model using observed ionospheric parameters, *Environmental Res. Paper 455, AFCRL-TR-73-0567.* Air Force Cambridge Research Laboratories, Bedford, Mass. 01730, USA.

13. Bradley, P.A., 1991, New prediction and retrospective ionospheric modelling initiative over Europe (PRIME), *Proceedings of the Solar- Terrestrial Predictions Workshop,* Leura, Australia.

14. Soicher, H.,and F.J. Gorman, 1991, Correlation analysis of ionospheric parameters at mid-latitudes, *Proceedings of the International commsphere symposium,* Israel,W1.2.1-W1.2.6.

15. Kovalevskaja, E.M., 1967, Horizontal gradients of critical F2-layer frequency associated with local time, *Geomagnetism and Aeronomie,* **7**, 588-519.

16. Kerbly, T.S., E.M. Kovalevskaja, G.N. Nosova, V.N. Novish-Bilinskaja, Sh.G. Shlionsky, E.M. Zulina, 1969, *Foundations of long radio prediction*, Nauka, Moscow,68p /in Russian/.

APPENDIX 1

TURBO-PASCAL PROGRAM for imprint and view of ionospheric ionograms on computer screen.

```
program IonogramPattern;
{ This program transforms the pattern of ionograms from
text mode to graphics mode.
  This program is provided with Turbo Pascal 5.0.

  To run this program you will need the following files:

    TURBO.EXE (or TPC.EXE)
    TURBO.TPL - The standard units
    GRAPH.TPU - The Graphics unit
    *.BGI     - The graphics device drivers

  Runtime Commands for IonogramPattern
  ------------------------------------
  <B>   - changes background color
  <ESC> - exits program
}

uses
  Crt, Graph;

const
   Memory  = 100;
   Windows =   4;

type
  ResolutionPreference = (Lower, Higher);
  ColorList = array [1..Windows] of integer;
```

```
var
MS                :integer;
MN                :array[1..250] of integer;
symbol               :array[1..250,1..100] of string[1];
  Xmax,Ymax,
  ViewXmax,
  ViewYmax,
  XMsg, XIonMsg, YhighMsg,YlowMsg,
  YhighIonMsg,
  YlowIonMsg,
  XminIonFrame,
  XmaxIonFrame,
  YminIonFrame,
  YmaxIonFrame:integer;
  Colors: ColorList;
  Ch: char;
  BackColor:integer;
  GraphDriver, GraphMode : integer;
  MaxColors : word;
  MaxDelta:integer;
  ChangeColors: Boolean;
  IonStationMsg        :string;

procedure Frame;
begin
  SetViewPort(XminIonFrame, YminIonFrame,
  XmaxIonFrame+1, YmaxIonFrame+1 ,ClipOn);
  SetColor(MaxColors);
  Rectangle(XminIonFrame, YminIonFrame, XmaxIonFrame,
  YmaxIonFrame);
  SetViewPort(XminIonFrame+1, YminIonFrame+1,
  XmaxIonFrame-1, YmaxIonFrame-1,ClipOn);
end  { Frame };
```

```
procedure FullPort;
{ Set the view port to the entire screen }
begin
  SetViewPort(0, 0, Xmax, Ymax, ClipOn);
end; { FullPort }

procedure MessageFrame(Msg:string);
begin
  FullPort;
  SetColor(MaxColors);
  SetTextStyle(DefaultFont, HorizDir, 1);
  SetTextJustify(CenterText, TopText);
  SetLineStyle(SolidLn, 0, NormWidth);
  SetFillStyle(EmptyFill, 0);
  Bar(0, YlowMsg, XMsg, YhighMsg);
  Rectangle(0, YlowMsg, XMsg, YhighMsg);
  OutTextXY(XMsg div 2, YhighMsg-(TextHeight('M')+2),
Msg);
   SetColor(MaxColors);
  { Go back to the main window }
  Frame;
end  { MessageFrame };

procedure IonMessageFrame(IonMsg:string);
begin
  FullPort;
  SetColor(MaxColors);
  SetTextStyle(DefaultFont, HorizDir, 1);
  SetTextJustify(LeftText, TopText);
  SetLineStyle(SolidLn, 0, NormWidth);
  SetFillStyle(EmptyFill, 0);
  Bar(0,YlowIonMsg,XMsg,YhighIonMsg);
  Rectangle(0,YlowIonMsg,XMsg,YhighIonMsg);
  OutTextXY(10,YhighIonMsg-TextHeight('M')-2, IonMsg);
  SetColor(MaxColors);
  { Go back to the main window }
  Frame;
end  {IonMessageFrame };
```

```
procedure WaitToGo;
var
  Ch : char;
begin
  MessageFrame('Press any key to continue... Esc
  aborts');
  repeat until KeyPressed;
  Ch := ReadKey;
  if Ch = #27 then begin
      CloseGraph;
      Writeln('All done.');
      Halt(1);
    end
  else
    ClearViewPort;
  MessageFrame('Press any key to stop action, Esc
quits.');
end; { WaitToGo }

procedure StopToPaint;
var
  Ch : char;
begin
  MessageFrame('Press any key to stop action... Esc
  aborts');
  if KeyPressed then begin
  Ch := ReadKey;
  if Ch = #27 then begin
      CloseGraph;
      Writeln('All done.');
      Halt(1);
    end;
   repeat until KeyPressed  ; MessageFrame('Press any
key to continue...');
   end;
end; { StopToPaint }
```

```
procedure TestGraphError(GraphErr: integer);
begin
  if GraphErr <> grOk then begin
    Writeln('Graphics error: ',
GraphErrorMsg(GraphErr));
    repeat until keypressed;
    ch := readkey;
    Halt(1);
  end;
end;

procedure Init;
var
  Err, I: integer;
  StartX, StartY: integer;
  Resolution: ResolutionPreference;
  s: string;
begin
  Resolution := Lower;
  if ParamCount > 0 then begin
    s := ParamStr(1);
    if s[1] = '/' then
      if upcase(s[2]) = 'H' then
        Resolution := Higher;
  end;

  Ch := ' ';
  GraphDriver := Detect;
  DetectGraph(GraphDriver, GraphMode);
  TestGraphError(GraphResult);
  case GraphDriver of
    CGA        : begin
                   MaxDelta := 7;
                   GraphDriver := CGA;
                   GraphMode := CGAC1;
                 end;
```

```
MCGA          : begin
                  MaxDelta := 7;
                  case GraphMode of
                    MCGAMed, MCGAHi: GraphMode :=
MCGAC1;
                  end;
                end;

EGA           : begin
                  MaxDelta := 16;
                  If Resolution = Lower then
                    GraphMode := EGALo
                  else
                    GraphMode := EGAHi;
                end;

EGA64         : begin
                  MaxDelta := 16;
                  If Resolution = Lower then
                    GraphMode := EGA64Lo
                  else
                    GraphMode := EGA64Hi;
                end;

 HercMono     : MaxDelta := 16;
 EGAMono      : MaxDelta := 16;
 PC3270       : begin
                 MaxDelta := 7;
                 GraphDriver := CGA;
                 GraphMode := CGAC1;
               end;


 ATT400       : case GraphMode of
                  ATT400C1,
                  ATT400C2,
                  ATT400Med,
                  ATT400Hi  :
```

```
                    begin
                      MaxDelta := 7;
                      GraphMode := ATT400C1;
                    end;
                end;

   VGA          : begin
                    MaxDelta := 16;
                  end;
 end;
 InitGraph(GraphDriver, GraphMode, '');
 TestGraphError(GraphResult);
 SetTextStyle(DefaultFont, HorizDir, 1);
 SetTextJustify(CenterText, TopText);
 MaxColors := GetMaxColor;
 BackColor := 0;
 ChangeColors := TRUE;
 Xmax := GetMaxX;
 Ymax := GetMaxY;
 ViewXmax := XmaxIonFrame-2;
 ViewYmax := YmaxIonFrame-2;
 XMsg:=Xmax;
 XIonMsg:=Xmax;
 YhighMsg:= Ymax;
 YlowMsg:= Ymax-3-(TextHeight('M')+4);
 YhighIonMsg:= YlowMsg-2;
 YlowIonMsg:=YhighIonMsg-15;
 XminIonFrame:=0;
 XmaxIonFrame:=Xmax;
 YminIonFrame:=0;
 YmaxIonFrame:=YlowIonMsg-5;

end; {init}
```

```
procedure Regenerate;
var
  I: integer;
begin
  Frame;
  WaitToGo;
  Frame;
end;

procedure CheckForUserInput;
begin
  if KeyPressed then begin
    Ch := ReadKey;
    if Upcase(Ch) = 'B' then begin
      if BackColor > MaxColors then BackColor := 0 else
      Inc(BackColor);
      SetBkColor(BackColor);
      end;
      if Ch<>#27 then Regenerate;
  end;
end;

procedure DoArt;
var
i,j,xv  :integer;
{ai,ae   :integer;
radius  :word;}
begin
 repeat
  SetColor(MaxColors);
  SetTextStyle(DefaultFont, HorizDir, 1);
  SetTextJustify(LeftText, TopText);
  OutTextXY(4,YmaxIonFrame-55, '100');
  OutTextXY(4,YmaxIonFrame-115, '200');
  OutTextXY(4,YmaxIonFrame-175, '300');
  OutTextXY(4,YmaxIonFrame-235, '400');
  OutTextXY(4,YmaxIonFrame-295,'500');
  OutTextXY(4,YmaxIonFrame-355,'600');
```

```
  OutTextXY(40,YmaxIonFrame-10,'1');
  OutTextXY(78,YmaxIonFrame-10,'2');
  OutTextXY(115,YmaxIonFrame-10,'3');
  OutTextXY(159,YmaxIonFrame-10,'4');
  OutTextXY(198,YmaxIonFrame-10,'5');
  OutTextXY(237,YmaxIonFrame-10,'6');
  OutTextXY(276,YmaxIonFrame-10,'7');
  OutTextXY(315,YmaxIonFrame-10,'8');
  OutTextXY(354,YmaxIonFrame-10,'9');
  OutTextXY(393,YmaxIonFrame-10,'10');
  OutTextXY(432,YmaxIonFrame-10,'11');
  OutTextXY(471,YmaxIonFrame-10,'12');
for j:=1 to MS do
     begin   SetColor(2);
for i:=1 to MN[j] do
     begin  SetColor(2);
if symbol[i,j]=' ' then SetColor(0) ;
if symbol[i,j]='B' then SetColor(1) ;
if symbol[i,j]='#' then SetColor(2) ;
if symbol[i,j]='C' then SetColor(3) ;
if symbol[i,j]='@' then SetColor(4) ;
if symbol[i,j]='P' then SetColor(5) ;
if symbol[i,j]='E' then SetColor(6) ;
if symbol[i,j]='d' then SetColor(7) ;
if symbol[i,j]='F' then SetColor(8) ;
if symbol[i,j]='Q' then SetColor(9) ;
if symbol[i,j]='A' then SetColor(10) ;
if symbol[i,j]='H' then SetColor(11) ;
if symbol[i,j]='f' then SetColor(12) ;
if symbol[i,j]='I' then SetColor(13) ;
if symbol[i,j]='2' then SetColor(14) ;
if symbol[i,j]='3' then SetColor(15) ;
     PieSlice(j*4+20,YmaxIonFrame-3*i-10,0,180,1);
        end;
     StopToPaint;end;
    CheckForUserInput;
  until Ch=#27;
end;
```

```
procedure IonDataRead;
label     1;
var
   Filename :string;
   Outname  :string;
   F        : text;
   h,nois          :string;
   tl,t2,t3 :string;
   IOCode   :integer;
   station  :word;
   dat     :string[9];
   hour,min,a2     :string[2];
   al,syml         :string[1];
   foF2,foFl,hF,hF2,M3000,Fmin,FoEs,MUF,FminF
     :string[4];
   fxi,fminE,foE,hE,hEs,qF,qE,FF,FE
     :string[4];
   a0              :string[7];
   country         :string[8];
   a3              :string[3];
   stek,ln,ls,ii             :integer;
begin
   {$I-}
   repeat
     Write('input name of file    ');
     readln(Filename);
     Assign(F,Filename);
     Reset(F);
     IOCode:=IOResult;
     if IOCode <> 0
     then Writeln('file  ',Filename,'  is not created');
     until IOCode = 0;
     {$I+}
       begin
        tl:='        STATION YEAR DAY H   M     OUT OPT B
             E  Q CAB XLZT NRW HEIG PROGRAM';
        t2:='        FOF2  FOFl  H''F   H''F2  M3000 FMIN
```

```
                 FOES  MUF   FMINF';
            t3:='       FXI   FMINE FOE   H''E   H''ES  QF
                 QE    FF    FE   ';
                 nois:=' NOISE  RANGE [KM]';
                  while not EOF(F) do
                   begin
                      readln(F,h);
                        if h=t1
                        then
read(F,station,a3,dat,hour,a1,min) ;
                        if h=t2
                        then
read(F,a0,foF2,a2,foF1,a2,hF,a2,hF2,a2,M3000,a2,Fmin,a2
FoEs a2,MUF,a2 FminF);
                        if h=t3 then stek:=1 else stek:=0 ;
                        if stek=1 then
read(F,a0,fxi,a2,fminE,a2,foE,a2,hE,a2,hEs,a2,qF,a2,qE,
2,FF a2,FE);
                        if stek=1 then goto 1;
                    end;
              1:if station=41 then country:='Roquetes'
                               else country:='no';
                 write(station,' ',dat,hour,' ',min,' ');
                 write(foF2,' ',foF1,' ',foE,' ',Fmin,'
                       ',FminF,' ',fminE,' ');
                 write(hF2,' ',hF,' ',hE,' ',M3000,' ',MUF);
                 writeln;
                 IonStationMsg:='  station '+country+'
                 date  '+dat+ '     time '+hour+':'+min+'
                  f0F2='+foF2+' MHz';
                 readln(F);
                 while not EOF(F) do
                  begin
                  ls:=0;
                   readln(F,h);
                   if h=nois then
                    begin
                     ls:=0;
```

```
{ This Program composes  the list of files
contained on the disk }

Uses DOS;
var
Dirinfo  :SearchRec;
fileinfo :SearchRec;
st       :string;
begin
   FindFirst('a:\*.*',Directory,dirinfo);
     while DosError=0 do
        begin
        Writeln('   ',Dirinfo.name);
             st:=Dirinfo.name;
             st:='a:\'+st;
             Chdir(st);
                begin
                  FindFirst('*.*',Archive,fileinfo);
                  while DosError=0 do
                    begin
                      writeln(fileinfo.name);
                      FindNext(fileinfo);
                    end;
                end;
                  FindNext(dirinfo);
         end;
 end.
```

```
                 readln(F);
                 while not Eof(F) do
                  begin
                   ls:=ls+1;ln:=0;
                    while not Eoln(F)  do begin
                     ln:=ln+1;read(F,symbol[ln,ls]) end;
                     readln(F);MN[ls]:=ln;end;
                     MS:=ls;end;
               end;
           end;
        end;{IonDataRead}
procedure WaitToPaint;
var
Ch : char;
begin
  Writeln(' Would you like to show ionograms? Press any
  key to continue...Esc aborts' );
  repeat until KeyPressed;
  Ch := ReadKey;
  if Ch = #27 then begin
      Writeln('All done.');
      Halt(1);end
  else writeln('painting')
end; { WaitToPaint }

begin
   IonDataRead;
   WaitToPaint;
   Init;
   Frame;
   MessageFrame('Press a key to stop action, Esc
   quits.');
   IonMessageFrame(IonStationMsg);
   DoArt;
   CloseGraph;
   RestoreCrtMode;
   Writeln('The End.');
end.
```

APPENDIX 2

Tables of mean values of the parameters foF2, MUF and H'F(x,y), r.m.s. (Sx,Sy), regressive coefficients bo and b1, cross correlation coefficients r for every two from each three stations (Rome, Roquetes and Dourbes) as functions of Local Time. The numbers of points (N) are given also for every month from September 1990 to October 1991.

September 1990 Rome-Dourbes F0F2

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	6.71	5.70	0.54	0.60	0.53	0.77	0.685	25
2	6.39	5.40	0.43	0.48	1.39	0.63	0.563	24
4	5.76	4.79	0.43	0.62	-2.13	1.20	0.824	23
6	6.94	5.87	0.88	0.84	0.96	0.71	0.744	21
8	9.50	7.77	1.21	1.26	1.96	0.61	0.588	23
10	10.28	8.87	1.05	1.45	-2.15	1.07	0.778	24
12	10.94	9.39	0.98	1.19	0.51	0.81	0.674	22
14	11.01	9.55	0.78	1.05	-2.26	1.07	0.795	26
16	10.81	9.22	0.89	0.91	-0.57	0.91	0.887	28
18	10.46	9.00	0.59	0.59	1.77	0.69	0.702	24
20	8.57	7.86	0.71	0.92	1.27	0.77	0.597	25
22	7.11	6.11	0.60	0.77	0.84	0.74	0.577	24

September 1990 Rome-Dourbes H`F

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	296.38	302.14	34.74	30.16	293.91	0.03	0.032	26
2	303.84	319.08	22.51	30.47	119.42	0.66	0.485	25
4	292.00	320.33	30.53	55.23	9.89	1.06	0.588	24
6	257.71	246.76	19.21	16.20	109.33	0.53	0.632	21
8	227.65	232.09	10.98	11.37	199.25	0.14	0.139	23
10	219.39	225.35	12.38	24.60	236.48	-0.05	-0.026	23
12	216.22	224.13	18.38	19.38	241.75	-0.08	-0.077	24
14	219.33	226.67	10.03	16.96	282.51	-0.25	-0.151	27
16	235.50	237.57	6.24	12.14	295.27	-0.25	-0.126	28
18	250.72	246.00	9.54	10.94	44.10	0.81	0.702	25
20	244.26	247.88	13.62	14.76	71.27	0.72	0.667	25
22	269.25	294.46	24.66	33.43	232.41	0.23	0.170	24

September 1990 Rome-Dourbes MUF(3000)F2

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	17.38	15.19	1.79	1.95	7.39	0.45	0.411	26
2	16.61	13.35	1.55	1.73	3.06	0.62	0.555	25
4	15.37	12.44	1.69	2.06	-2.52	0.97	0.801	24
6	20.06	19.66	3.41	4.03	0.40	0.96	0.813	21
8	28.75	24.06	4.27	4.63	3.82	0.70	0.650	23
10	30.28	26.64	3.52	4.47	-4.26	1.02	0.804	24
12	30.53	27.04	2.88	3.57	2.34	0.81	0.654	24
14	31.34	27.61	2.65	3.22	-3.62	1.00	0.820	27
16	31.18	27.40	2.84	3.12	-2.92	0.97	0.883	28
18	31.81	26.97	2.15	2.38	1.79	0.79	0.716	24
20	25.60	22.61	2.97	3.05	4.49	0.71	0.689	25
22	19.66	16.32	2.18	3.01	2.17	0.72	0.522	24

September 1990 Rome-Roquetes F0F2

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	6.60	6.77	0.56	0.73	0.35	0.97	0.740	30
2	6.32	6.21	0.46	1.13	-3.55	1.54	0.626	27
4	5.71	5.68	0.42	0.63	-0.38	1.06	0.707	25
6	6.83	6.81	0.85	1.05	0.67	0.90	0.731	26
8	9.46	9.13	1.27	1.12	2.73	0.68	0.763	28
10	10.30	9.93	1.03	1.38	-0.16	0.98	0.728	29
12	11.05	10.90	0.96	1.00	1.52	0.85	0.811	27
14	11.07	10.81	0.80	0.78	2.09	0.79	0.802	28
16	10.80	10.37	0.87	0.98	2.16	0.76	0.676	29
18	10.47	9.14	0.60	1.64	-2.59	1.12	0.413	28
20	8.53	7.88	0.69	0.92	4.94	0.34	0.260	28
22	7.06	6.95	0.58	0.76	2.48	0.63	0.482	28

September 1990 Rome-Roquetes H`F

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	294.27	298.43	33.33	30.72	137.66	0.55	0.593	30
2	303.43	304.00	21.32	31.87	161.57	0.47	0.314	28
4	293.77	302.35	28.17	33.89	60.78	0.82	0.683	26
6	259.85	256.54	21.32	21.51	67.72	0.73	0.720	26
8	229.00	230.39	10.89	9.11	179.15	0.22	0.268	28
10	220.50	218.07	12.92	11.41	121.10	0.44	0.498	28
12	214.05	216.25	18.29	12.78	258.30	-0.20	-0.281	28
14	219.43	229.29	9.86	14.12	250.15	-0.10	-0.066	28
16	235.24	243.76	6.29	13.23	193.48	0.21	0.102	29
18	249.24	240.86	10.62	20.00	106.03	0.54	0.287	29
20	244.88	235.46	13.51	20.42	24.54	0.86	0.570	28
22	265.71	269.82	24.81	25.33	184.99	0.32	0.313	28

September 1990 Rome-Roquetes MUF(3000)F2

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	17.25	17.58	1.72	2.23	1.18	0.95	0.731	30
2	16.45	16.27	1.54	2.82	-4.48	1.26	0.689	28
4	15.19	14.98	1.68	2.37	-2.10	1.12	0.796	26
6	19.48	20.84	3.45	4.14	2.61	0.94	0.778	26
8	28.82	28.54	4.50	4.24	7.32	0.74	0.781	28
10	30.47	29.69	3.79	3.22	11.11	0.61	0.718	29
12	30.93	30.63	2.97	3.37	1.65	0.94	0.826	28
14	31.38	30.60	2.60	2.51	6.08	0.78	0.811	28
16	31.17	30.59	2.79	2.39	8.73	0.70	0.819	29
18	31.98	30.49	2.51	4.03	0.92	0.92	0.575	28
20	25.49	24.40	2.86	3.31	5.04	0.76	0.656	28
22	19.67	18.74	2.04	2.51	11.29	0.38	0.308	28

September 1990 Dourbes-Roquetes F0F2

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	5.70	6.87	0.60	0.70	2.05	0.85	0.729	25
2	5.39	6.29	0.48	1.12	-1.16	1.38	0.589	26
4	4.84	5.74	0.63	0.66	1.80	0.81	0.782	26
6	5.93	6.94	0.83	1.18	-0.07	1.18	0.830	25
8	7.85	9.17	1.24	1.17	3.92	0.67	0.710	25
10	8.87	9.90	1.45	1.32	5.72	0.47	0.518	24
12	9.35	10.70	1.15	1.01	5.76	0.53	0.603	24
14	9.60	10.78	1.07	0.80	5.30	0.57	0.766	28
16	9.29	10.43	0.96	1.00	4.19	0.67	0.646	29
18	8.98	9.07	0.58	1.44	-0.57	1.07	0.431	26
20	7.87	7.81	0.92	0.94	4.20	0.46	0.451	27
22	6.11	6.94	0.77	0.79	3.56	0.55	0.536	26

September 1990 Dourbes-Roquetes H`F

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	302.14	299.58	30.16	32.88	220.08	0.26	0.241	26
2	317.15	301.19	30.09	32.16	114.74	0.59	0.550	27
4	317.73	299.81	55.59	36.91	139.08	0.51	0.762	26
6	245.12	253.08	16.76	20.11	146.33	0.44	0.363	25
8	230.72	229.88	12.22	9.49	170.66	0.26	0.330	25
10	225.46	217.75	24.06	11.75	211.71	0.03	0.055	24
12	223.68	216.88	19.10	11.37	246.94	-0.13	-0.226	25
14	228.21	227.00	18.22	16.72	173.45	0.23	0.256	29
16	237.48	243.41	11.93	13.19	270.92	-0.12	-0.105	29
18	245.00	242.19	11.87	19.57	142.45	0.41	0.247	26
20	246.96	237.59	14.58	18.13	60.29	0.72	0.577	27
22	292.69	269.42	34.01	28.58	153.30	0.40	0.472	26

September 1990 Dourbes-Roquetes MUF(3000)F2

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	15.19	17.83	1.95	2.21	8.60	0.61	0.536	26
2	13.43	16.58	1.71	2.80	-0.62	1.29	0.780	27
4	12.44	15.19	1.98	2.37	1.98	1.06	0.888	26
6	20.02	21.29	3.93	4.53	2.21	0.95	0.828	25
8	24.51	28.56	4.71	4.39	10.55	0.73	0.788	25
10	26.64	29.63	4.47	2.99	19.05	0.40	0.593	24
12	27.07	29.98	3.50	3.18	16.65	0.49	0.541	25
14	27.70	30.53	3.33	2.82	10.69	0.72	0.846	29
16	27.62	30.72	3.29	2.53	12.29	0.67	0.867	29
18	27.03	30.28	2.32	3.42	12.17	0.67	0.455	26
20	22.77	24.32	3.09	3.36	6.43	0.79	0.724	27
22	16.35	18.80	3.10	2.58	8.35	0.64	0.770	26

October 1990 Rome-Dourbes F0F2

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	5.83	5.18	0.69	0.67	0.79	0.75	0.778	27
2	5.65	4.88	0.70	0.66	0.59	0.76	0.808	27
4	5.32	4.47	0.66	0.76	-0.30	0.90	0.784	27
6	5.49	4.61	0.70	0.65	0.39	0.77	0.830	27
8	10.33	8.71	1.24	1.41	0.71	0.77	0.680	26
10	12.06	10.88	1.45	1.97	-3.80	1.22	0.898	27
12	12.58	11.53	1.45	1.81	-1.84	1.06	0.850	27
14	12.53	11.16	1.17	1.94	-6.64	1.42	0.859	26
16	12.24	10.81	1.20	1.55	-0.45	0.92	0.712	26
18	9.72	8.96	1.14	1.05	3.10	0.60	0.658	27
20	7.45	6.66	0.85	1.06	-1.01	1.03	0.819	28
22	6.34	5.42	0.74	0.77	-0.01	0.86	0.822	28

October 1990 Rome-Dourbes H`F

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	288.11	313.81	36.52	33.54	112.61	0.70	0.760	27
2	298.15	318.19	32.01	26.34	143.81	0.58	0.711	27
4	296.22	305.33	32.02	62.85	-25.96	1.12	0.570	27
6	264.44	256.76	38.20	28.95	97.35	0.60	0.795	27
8	229.38	232.27	9.65	11.89	59.28	0.75	0.612	26
10	222.58	226.81	9.90	13.20	149.09	0.35	0.262	26
12	218.35	230.67	12.68	19.42	292.43	-0.28	-0.185	27
14	224.54	228.46	7.62	9.42	184.94	0.19	0.157	26
16	239.48	231.15	22.32	15.36	252.88	-0.09	-0.132	27
18	223.03	234.00	11.46	14.63	154.30	0.36	0.280	29
20	243.00	251.64	17.78	27.18	159.88	0.38	0.247	28
22	273.86	287.57	31.34	39.14	66.26	0.81	0.647	28

October 1990 Rome-Dourbes MUF(3000)F2

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	15.82	13.21	2.17	2.19	0.74	0.79	0.781	27
2	15.21	12.14	2.13	1.94	0.41	0.77	0.845	27
4	14.49	11.61	2.44	2.51	-0.12	0.81	0.787	27
6	14.87	15.58	2.48	3.14	-0.11	1.06	0.837	27
8	32.41	29.05	4.83	5.98	-3.07	0.99	0.801	26
10	36.79	34.18	5.15	6.96	-9.25	1.18	0.874	27
12	36.84	35.18	4.88	6.23	-2.43	1.02	0.799	27
14	36.16	34.21	3.44	6.16	-22.85	1.58	0.881	26
16	37.04	32.94	3.98	4.90	0.46	0.88	0.711	27
18	30.93	26.43	3.72	3.34	10.09	0.53	0.589	29
20	22.62	18.64	2.54	3.48	-5.20	1.05	0.768	28
22	17.80	14.64	2.62	3.07	0.37	0.80	0.682	28

October 1990 Rome-Roquetes F0F2

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	5.70	5.50	0.61	0.73	1.38	0.72	0.599	26
2	5.57	5.45	0.69	0.65	1.40	0.73	0.775	26
4	5.24	5.15	0.65	0.70	1.28	0.74	0.693	26
6	5.50	5.61	0.71	0.55	2.69	0.53	0.683	25
8	10.56	10.32	1.11	1.22	2.60	0.73	0.663	26
10	12.23	11.76	1.50	1.26	2.05	0.79	0.945	27
12	12.65	11.89	1.42	0.97	4.08	0.62	0.905	30
14	12.54	11.59	1.11	1.09	0.86	0.86	0.872	30
16	12.31	10.04	1.16	1.80	7.87	0.18	0.113	28
18	9.70	8.10	1.20	0.73	4.87	0.33	0.550	29
20	7.40	7.17	0.90	1.31	0.10	0.95	0.653	26
22	6.22	6.06	0.80	1.04	-0.46	1.05	0.798	27

October 1990 Rome-Roquetes H`F

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	292.04	297.58	36.49	40.10	109.39	0.64	0.586	26
2	297.38	295.27	32.04	33.95	214.63	0.27	0.256	26
4	292.85	283.85	31.34	45.87	61.92	0.76	0.518	26
6	262.32	260.72	35.73	22.00	139.07	0.46	0.753	25
8	227.77	231.38	8.73	10.27	193.84	0.16	0.140	26
10	223.50	225.38	10.08	10.09	197.43	0.13	0.125	26
12	217.71	221.23	12.89	13.42	268.44	-0.22	-0.208	30
14	225.00	233.63	7.35	7.55	189.24	0.20	0.192	30
16	239.71	242.60	21.94	8.34	222.26	0.08	0.223	28
18	222.21	224.72	11.51	10.08	230.38	-0.03	-0.029	29
20	243.00	240.65	18.92	21.78	239.43	0.01	0.004	26
22	274.67	273.30	31.72	31.78	83.19	0.69	0.691	27

October 1990 Rome-Roquetes MUF(3000)F2

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	15.35	14.63	2.09	2.15	2.76	0.77	0.751	26
2	14.98	14.62	2.12	2.26	1.31	0.89	0.832	26
4	14.22	14.15	2.39	2.50	1.03	0.92	0.884	26
6	14.85	16.10	2.39	2.23	5.86	0.69	0.740	25
8	33.23	33.25	4.04	3.76	8.90	0.73	0.786	26
10	37.32	36.17	5.26	4.92	4.26	0.86	0.915	27
12	37.16	35.68	4.75	3.52	11.49	0.65	0.879	30
14	36.16	34.86	3.21	2.90	5.74	0.81	0.891	30
16	37.24	32.78	3.81	4.14	22.02	0.29	0.266	28
18	30.97	27.90	3.75	2.94	11.77	0.52	0.665	29
20	22.51	21.70	2.76	3.93	-1.28	1.02	0.716	26
22	17.44	16.71	2.76	3.07	2.13	0.84	0.750	27

October 1990 Dourbes-Roquetes F0F2

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	5.11	5.53	0.67	0.73	1.29	0.83	0.758	23
2	4.83	5.48	0.67	0.66	1.97	0.73	0.745	24
4	4.42	5.17	0.78	0.71	2.08	0.70	0.770	24
6	4.59	5.57	0.68	0.54	3.41	0.47	0.599	24
8	8.79	10.18	1.35	1.24	3.93	0.71	0.778	23
10	10.87	11.54	2.09	1.23	5.77	0.53	0.903	23
12	11.53	11.81	1.85	0.95	6.65	0.45	0.866	26
14	11.13	11.61	1.98	1.19	6.06	0.50	0.825	25
16	10.77	9.91	1.65	1.77	9.24	0.06	0.058	23
18	8.96	8.15	1.09	0.64	6.70	0.16	0.278	25
20	6.56	7.18	1.06	1.36	1.52	0.86	0.672	23
22	5.30	6.14	0.74	1.00	0.31	1.10	0.820	24

October 1990 Dourbes-Roquetes H`F

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	314.25	296.08	35.69	41.81	38.38	0.82	0.700	24
2	316.75	294.63	28.35	35.67	63.94	0.73	0.579	24
4	305.38	283.08	64.89	48.44	124.50	0.52	0.696	24
6	255.27	259.38	25.62	22.50	61.75	0.77	0.881	24
8	231.82	231.13	8.84	10.61	150.26	0.35	0.290	23
10	229.00	226.78	12.34	9.29	236.36	-0.04	-0.056	23
12	230.96	221.08	19.74	14.44	224.51	-0.01	-0.020	26
14	228.28	234.40	9.57	6.79	217.24	0.08	0.106	25
16	230.71	343.58	16.19	7.34	212.85	0.13	0.294	24
18	234.81	224.70	14.79	10.46	153.01	0.31	0.432	27
20	255.13	240.13	28.31	22.35	196.30	0.17	0.218	23
22	291.38	275.75	39.66	31.65	79.17	0.67	0.845	24

October 1990 Dourbes-Roquetes MUF(3000)F2

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	13.09	14.92	2.27	2.44	3.86	0.84	0.785	24
2	12.06	14.77	2.01	2.36	3.45	0.94	0.800	24
4	11.55	14.25	2.58	2.57	4.56	0.84	0.842	24
6	15.60	16.02	3.07	2.25	7.53	0.54	0.742	24
8	29.52	32.88	5.56	3.89	15.66	0.58	0.834	23
10	34.22	35.59	7.32	5.08	14.40	0.62	0.893	23
12	35.28	35.48	6.34	3.68	17.63	0.51	0.871	26
14	34.15	34.88	6.28	3.16	19.74	0.44	0.880	25
16	32.91	32.58	5.20	4.13	27.44	0.16	0.197	24
18	26.33	27.80	3.38	2.98	16.09	0.44	0.504	27
20	18.25	21.77	3.53	4.15	4.06	0.97	0.823	23
22	14.29	16.93	3.17	3.08	4.61	0.86	0.888	24

November 1990 Rome-Dourbes F0F2

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	4.52	4.14	0.58	0.73	-0.48	1.02	0.814	27
2	4.59	4.16	0.51	0.68	-0.42	1.00	0.747	28
4	4.43	3.80	0.61	0.82	-0.16	0.89	0.658	29
6	4.23	3.43	0.59	0.53	0.92	0.59	0.669	29
8	9.87	8.45	1.11	1.16	0.81	0.77	0.737	28
10	12.14	11.07	1.04	1.37	4.59	0.53	0.406	28
12	12.29	12.00	1.12	1.14	2.25	0.79	0.784	28
14	11.88	11.50	1.10	1.22	0.23	0.95	0.851	28
16	11.10	10.41	1.35	1.24	2.28	0.73	0.803	28
18	6.79	6.68	1.31	1.28	0.90	0.85	0.869	29
20	5.20	4.59	0.94	0.82	1.21	0.65	0.752	29
22	4.46	4.07	0.80	0.77	0.35	0.83	0.864	28

November 1990 Rome-Dourbes H`F

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	285.45	309.45	32.21	55.31	397.76	-0.31	-0.180	29
2	281.69	304.14	23.30	43.59	14.41	1.03	0.550	29
4	271.45	284.48	34.04	46.00	100.34	0.68	0.502	29
6	259.66	258.97	32.31	39.95	116.94	0.55	0.442	29
8	221.89	222.64	7.14	10.53	40.52	0.82	0.556	28
10	221.14	220.79	8.28	5.34	232.87	-0.05	-0.085	28
12	223.71	223.68	9.64	9.83	261.35	-0.17	-0.165	28
14	229.29	227.75	7.37	6.75	213.20	0.06	0.069	28
16	227.14	212.29	7.78	7.78	202.17	0.04	0.045	28
18	219.52	226.76	16.08	28.70	250.40	-0.11	-0.060	29
20	249.10	259.21	29.42	46.03	-13.42	1.09	0.700	29
22	280.55	293.59	33.51	24.70	207.45	0.31	0.417	29

November 1990 Rome-Dourbes MUF(3000)F2

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	12.56	11.05	1.76	1.91	2.45	0.68	0.630	28
2	12.89	10.90	1.50	1.83	0.17	0.83	0.681	28
4	12.72	10.43	1.90	2.50	1.68	0.69	0.524	29
6	11.70	10.45	1.65	1.49	6.42	0.34	0.380	29
8	31.22	30.31	3.07	4.21	7.35	0.74	0.537	28
10	38.80	36.92	3.12	4.36	31.40	0.14	0.102	28
12	38.78	38.42	2.86	2.86	12.23	0.68	0.675	28
14	36.22	36.47	2.51	3.15	1.80	0.96	0.765	28
16	36.03	31.98	3.28	3.76	1.16	0.86	0.747	28
18	22.42	19.99	4.23	4.43	5.59	0.64	0.613	29
20	16.11	12.83	3.02	2.47	4.19	0.54	0.654	29
22	12.61	10.95	2.12	2.18	1.76	0.73	0.710	29

November 1990 Rome-Roquetes F0F2

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	4.61	4.92	0.48	0.65	-0.28	1.13	0.827	6
2	4.77	5.01	0.59	0.65	0.37	0.97	0.888	6
4	4.40	4.55	0.14	0.65	-2.74	1.66	0.363	6
6	4.13	4.15	0.37	0.52	0.12	0.98	0.688	6
8	9.79	9.05	0.24	0.94	-25.09	3.49	0.886	6
10	12.25	10.45	0.62	1.66	23.64	-1.08	-0.404	5
12	12.11	11.41	0.58	0.23	13.62	-0.18	-0.452	6
14	12.08	11.01	0.47	1.21	-12.10	1.91	0.749	5
16	12.22	9.91	0.41	1.25	-5.37	1.25	0.410	5
18	7.13	7.05	0.37	0.32	3.08	0.56	0.640	5
20	5.15	5.11	0.23	0.88	23.25	-3.52	-0.906	5
22	4.55	4.30	0.33	0.96	-4.89	2.02	0.690	5

November 1990 Rome-Roquetes H`F

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	289.00	295.00	34.66	17.09	202.03	0.32	0.652	6
2	289.00	271.50	27.21	36.83	426.77	-0.54	-0.397	6
4	261.00	264.00	21.72	33.27	250.72	0.05	0.033	6
6	257.00	250.83	21.27	26.19	-36.73	1.12	0.909	6
8	223.00	237.00	7.01	5.14	139.10	0.44	0.599	6
10	213.60	222.20	5.37	9.47	240.00	-0.08	-0.047	5
12	222.00	225.83	9.30	27.32	6.92	0.99	0.336	6
14	228.00	236.80	8.49	8.07	46.80	0.83	0.876	5
16	230.40	217.80	6.84	18.86	273.92	-0.24	-0.088	5
18	219.60	206.80	15.65	10.38	201.96	0.02	0.033	5
20	237.60	245.00	27.03	51.55	-149.54	1.66	0.871	5
22	272.37	259.40	20.16	37.38	281.74	-0.08	-0.044	5

November 1990 Rome-Roquetes MUF(3000)F2

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	12.48	13.38	1.39	1.56	4.34	0.72	0.645	6
2	13.67	14.03	2.03	2.08	2.28	0.86	0.840	6
4	12.85	13.87	1.05	2.26	-4.54	1.43	0.667	6
6	11.20	11.77	1.34	1.28	6.87	0.44	0.458	6
8	31.33	31.67	1.82	1.94	11.20	0.65	0.610	6
10	40.14	35.28	2.50	3.20	66.96	-0.79	-0.616	5
12	38.57	36.43	2.29	0.90	34.96	0.04	0.097	6
14	37.12	34.88	1.28	1.15	13.89	0.57	0.631	5
16	39.50	35.56	1.26	2.96	26.65	0.23	0.096	5
18	24.14	22.12	0.84	1.68	7.54	0.60	0.300	5
20	16.06	15.70	0.78	2.66	58.86	-2.69	-0.791	5
22	13.04	12.86	0.77	1.38	-5.38	1.40	0.781	5

November 1990 Dourbes-Roquetes FOF2

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	4.23	4.76	0.54	0.59	0.65	0.97	0.898	5
2	4.19	5.01	0.52	0.65	0.67	1.04	0.836	6
4	4.08	4.55	0.29	0.65	-1.33	1.44	0.632	6
6	3.45	4.15	0.29	0.52	4.84	-0.20	-0.113	6
8	8.33	9.05	0.74	0.94	5.84	0.38	0.302	6
10	10.49	10.45	1.36	1.66	-2.16	1.20	0.990	5
12	11.66	11.41	0.88	0.23	8.73	0.23	0.869	6
14	11.31	11.01	0.56	1.21	10.94	0.01	0.003	5
16	10.62	9.91	0.49	1.25	14.88	-0.47	-0.185	5
18	7.14	7.05	0.66	0.32	5.75	0.18	0.378	5
20	4.92	5.11	0.57	0.88	7.20	-0.43	-0.277	5
22	4.04	4.30	0.39	0.96	-2.81	1.76	0.708	5

November 1990 Dourbes-Roquetes H`F

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	308.00	295.00	28.11	17.09	149.58	0.47	0.777	6
2	293.67	271.50	16.10	36.83	154.52	0.40	0.174	6
4	268.17	264.00	31.52	33.27	312.21	-0.18	-0.170	6
6	254.00	250.83	26.21	26.19	4.52	0.97	0.970	6
8	225.00	237.00	12.65	5.14	173.72	0.28	0.692	6
10	216.80	222.20	2.77	9.47	727.60	-2.33	-0.683	5
12	220.67	225.83	13.34	27.32	224.68	0.01	0.003	6
14	233.00	236.80	2.74	8.07	19.33	0.93	0.317	5
16	210.40	217.80	9.29	18.86	174.28	0.21	0.102	5
18	217.80	206.80	8.98	10.38	26.11	0.83	0.718	5
20	239.00	245.00	12.45	51.55	347.15	-0.43	-0.103	5
22	294.40	259.40	13.22	37.38	198.26	0.21	0.073	5

November 1990 Dourbes-Roquetes MUF(3000)F2

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	11.45	13.38	1.44	1.56	2.98	0.91	0.840	6
2	11.40	14.03	1.37	2.08	-0.45	1.27	0.839	6
4	11.47	13.87	1.75	2.26	12.99	0.08	0.059	6
6	11.38	11.77	0.93	1.28	15.84	-0.36	-0.261	6
8	29.95	31.67	3.97	1.94	21.84	0.33	0.669	6
10	34.84	35.28	4.94	3.20	13.06	0.64	0.984	5
12	37.27	36.43	1.66	0.90	25.20	0.30	0.553	6
14	36.58	34.88	1.31	1.15	56.98	-0.60	-0.692	5
16	33.30	35.56	0.98	2.96	79.73	-1.33	-0.440	5
18	22.49	22.12	1.88	1.68	16.22	0.26	0.293	5
20	13.94	15.70	1.18	2.66	16.38	-0.05	-0.021	5
22	10.82	12.86	1.36	1.38	4.11	0.81	0.797	5

January 1991 Rome-Dourbes FOF2

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1£	r	N
0	4.02	3.67	0.55	0.43	1.74	0.48	0.619	29
2	4.14	3.69	0.40	0.42	2.08	0.39	0.376	30
4	4.07	3.40	0.43	0.53	2.41	0.24	0.199	30
6	3.78	3.31	0.53	0.55	1.79	0.40	0.382	30
8	8.69	7.22	0.87	0.91	0.53	0.77	0.744	30
10	12.17	11.43	0.98	1.01	6.37	0.42	0.403	29
12	11.57	11.62	0.90	0.99	4.00	0.66	0.595	29
14	11.04	11.30	0.66	0.44	6.27	0.46	0.681	29
16	9.78	9.61	0.83	0.96	1.92	0.79	0.680	28
18	7.41	6.82	1.12	0.92	1.94	0.66	0.802	27
20	4.76	4.30	0.89	0.86	0.74	0.75	0.772	28
22	4.17	3.78	0.94	0.79	0.75	0.73	0.870	27

January 1991 Rome-Dourbes H`F

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	286.29	304.83	28.00	30.72	141.97	0.57	0.518	30
2	290.20	315.27	22.14	28.65	298.36	0.06	0.045	30
4	277.80	292.63	25.17	40.20	28.40	0.95	0.596	30
6	265.53	268.73	35.66	52.82	100.16	0.63	0.429	30
8	221.60	219.80	8.33	14.47	48.18	0.77	0.446	30
10	228.21	221.79	9.00	6.95	259.72	-0.17	-0.215	29
12	223.86	220.69	7.01	4.54	210.15	0.05	0.073	29
14	226.55	227.14	9.71	8.09	219.43	0.03	0.041	29
16	224.14	220.82	8.20	15.79	292.10	-0.32	-0.165	28
18	223.58	224.00	12.57	16.07	253.36	-0.13	-0.103	29
20	246.31	257.45	27.84	27.75	211.12	0.19	0.189	29
22	282.67	292.70	32.11	32.72	190.22	0.36	0.356	27

January 1991 Rome-Dourbes MUF(3000)F2

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	11.33	9.99	1.88	1.30	4.79	0.46	0.663	30
2	11.57	9.62	1.36	1.22	7.59	0.18	0.196	30
4	11.58	9.46	1.22	1.76	2.54	0.60	0.415	30
6	11.14	9.68	2.03	1.70	6.51	0.28	0.340	30
8	27.68	27.82	2.46	2.76	7.66	0.73	0.650	30
10	38.44	37.89	3.70	3.33	26.29	0.30	0.334	28
12	36.69	37.61	3.23	2.46	26.61	0.30	0.393	29
14	33.77	36.01	1.95	1.89	19.31	0.49	0.511	29
16	31.81	29.41	2.14	2.67	27.58	0.06	0.046	28
18	24.18	20.76	3.26	3.11	7.23	0.56	0.587	28
20	15.15	12.03	2.66	2.68	2.36	0.64	0.635	29
22	11.84	10.36	2.97	2.16	4.22	0.52	0.711	27

January 1991 Rome-Roquetes F0F2

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	4.22	4.47	0.55	0.72	-0.42	1.16	0.888	9
2	4.27	4.48	0.44	0.61	0.59	0.91	0.660	9
4	4.18	3.97	0.40	0.49	-0.45	1.06	0.866	9
6	3.88	3.94	0.62	0.55	2.69	0.32	0.360	8
8	9.52	9.03	0.78	1.17	-2.18	1.18	0.785	8
10	11.86	11.56	1.22	1.06	2.19	0.79	0.906	9
12	11.75	11.75	0.88	0.65	6.35	0.46	0.622	9
14	11.25	10.60	0.68	1.03	-3.45	1.25	0.826	10
16	10.15	7.93	0.69	1.23	9.61	-0.17	-0.093	11
18	8.21	6.84	0.90	0.75	2.33	0.55	0.657	10
20	5.57	5.63	0.75	0.61	2.06	0.64	0.789	10
22	4.98	4.76	1.03	0.83	2.66	0.42	0.523	10

January 1991 Rome-Roquetes H`F

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	266.00	287.22	26.15	22.01	166.67	0.45	0.539	9
2	290.67	297.67	21.86	35.35	187.15	0.38	0.235	9
4	282.67	278.56	34.53	34.28	30.02	0.88	0.885	9
6	277.33	274.56	27.95	26.35	60.46	0.77	0.819	9
8	228.00	224.38	7.17	18.29	212.97	0.05	0.020	8
10	224.67	231.67	5.29	7.75	25.05	0.92	0.628	9
12	22 .67	231.89	7.21	9.28	147.62	0.37	0.289	9
14	232.80	235.20	5.51	7.42	238.26	-0.01	-0.010	10
16	229.64	243.00	6.62	4.00	214.72	0.12	0.204	11
18	230.10	232.20	13.71	17.15	-3.32	1.02	0.818	10
20	238.20	245.10	16.98	14.23	178.86	0.28	0.332	10
22	271.80	268.10	21.73	21.47	235.23	0.12	0.122	10

January 1991 Rome-Roquetes MUF(3000)F2

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	12.09	11.98	1.99	1.56	5.84	0.51	0.651	9
2	11.86	12.13	1.33	2.02	3.23	0.75	0.496	9
4	11.53	11.20	0.91	1.16	1.28	0.86	0.674	9
6	10.82	10.66	1.82	1.41	6.42	0.39	0.507	9
8	29.71	31.10	2.70	3.23	3.08	0.94	0.790	8
10	36.67	36.07	3.87	2.97	10.22	0.70	0.920	9
12	35.49	34.31	2.58	1.19	35.84	-0.04	-0.094	9
14	32.90	31.64	1.65	1.67	13.93	0.54	0.533	10
16	31.49	27.66	0.85	2.54	101.34	-2.34	-0.788	11
18	25.61	22.30	2.12	2.34	3.93	0.72	0.650	10
20	17.35	16.87	2.35	1.53	10.00	0.40	0.609	10
22	14.35	13.48	3.23	2.94	7.99	0.38	0.420	10

January 1991 Dourbes-Roquetes F0F2

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	3.78	4.47	0.44	0.72	1.40	0.81	0.498	9
2	3.58	4.48	0.31	0.61	1.02	0.97	0.497	9
4	3.37	3.97	0.46	0.49	4.69	-0.21	-0.199	9
6	3.17	3.94	0.58	0.55	4.18	-0.08	-0.080	8
8	8.17	9.03	1.11	1.17	1.28	0.95	0.900	8
10	11.66	11.56	1.40	1.06	8.67	0.25	0.326	9
12	11.89	11.75	1.46	0.65	7.12	0.39	0.869	9
14	11.33	10.60	0.48	1.03	-7.07	1.56	0.723	10
16	10.12	7.93	1.13	1.23	8.05	-0.01	-0.010	11
18	7.46	6.83	0.80	0.80	4.48	0.31	0.314	9
20	5.04	5.63	0.87	0.61	2.67	0.59	0.838	10
22	4.52	4.63	0.86	0.75	2.69	0.43	0.493	9

January 1991 Dourbes-Roquetes H`F

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	303.56	287.22	28.60	22.01	130.77	0.52	0.670	9
2	333.00	297.67	33.24	35.35	34.54	0.79	0.743	9
4	302.78	278.56	51.45	34.28	171.83	0.35	0.529	9
6	295.00	274.56	80.36	26.35	242.03	0.11	0.336	9
8	229.00	224.38	13.24	18.29	435.47	-0.92	-0.668	8
10	224.78	231.67	9.71	7.75	304.05	-0.32	-0.403	9
12	223.44	231.89	5.08	9.28	62.38	0.76	0.415	9
14	228.30	235.20	6.50	7.42	271.00	-0.16	-0.137	10
16	219.73	243.00	9.17	4.00	227.05	0.07	0.166	11
18	225.78	230.22	8.98	16.94	135.29	0.42	0.223	9
20	260.70	245.10	27.92	14.23	167.24	0.30	0.586	10
22	282.22	269.78	28.41	22.06	114.52	0.55	0.708	9

January 1991 Dourbes-Roquetes MUF(3000)F2

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	10.22	11.98	1.22	1.56	4.62	0.72	0.565	9
2	9.26	12.13	0.56	2.02	-4.59	1.81	0.505	9
4	9.12	11.20	1.49	1.16	12.77	-0.17	-0.220	9
6	9.28	10.66	1.75	1.41	9.30	0.15	0.181	9
8	30.03	31.10	3.70	3.23	13.83	0.58	0.659	8
10	37.87	36.07	3.87	2.97	33.58	0.07	0.086	9
12	37.49	34.31	2.36	1.19	26.40	0.21	0.419	9
14	35.13	31.64	2.00	1.67	18.28	0.38	0.455	10
16	29.63	27.66	3.07	2.54	37.09	-0.32	-0.385	11
18	22.77	22.11	2.86	2.40	10.02	0.53	0.633	9
20	13.97	16.87	3.04	1.53	11.54	0.38	0.759	10
22	12.02	12.84	2.45	2.28	8.35	0.37	0.401	9

February 1991 Rome-Dourbes F0F2

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	6.04	5.42	1.01	0.89	1.33	0.68	0.773	19
2	5.86	5.18	0.98	0.84	1.02	0.71	0.824	20
4	5.87	4.84	0.99	0.96	0.03	0.82	0.850	21
6	5.07	4.12	1.30	1.00	0.60	0.69	0.902	21
8	10.66	9.32	0.83	1.07	2.69	0.62	0.479	21
10	12.81	12.81	0.82	0.92	7.39	0.42	0.380	20
12	13.31	13.44	0.44	0.95	4.70	0.66	0.301	19
14	12.73	12.69	0.57	0.83	2.27	0.82	0.564	19
16	12.29	11.85	0.50	0.54	5.15	0.55	0.509	20
18	9.78	10.08	0.74	1.05	1.53	0.87	0.614	20
20	7.67	6.71	1.18	1.14	1.21	0.72	0.747	21
22	6.37	5.81	0.95	0.89	0.80	0.79	0.835	20

February 1991 Rome-Dourbes H`F

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	285.42	303.15	42.10	48.08	31.90	0.95	0.832	20
2	299.43	314.57	35.59	37.32	76.03	0.80	0.760	21
4	280.29	280.71	22.62	26.40	154.14	0.45	0.387	21
6	249.14	259.48	28.56	34.50	5.54	1.02	0.844	21
8	224.57	224.10	8.18	9.29	243.10	-0.08	-0.074	21
10	221.71	221.00	4.83	5.80	89.76	0.59	0.493	21
12	225.00	221.93	9.44	5.04	237.67	-0.07	-0.131	20
14	225.00	225.30	6.31	4.14	187.80	0.17	0.254	20
16	232.80	226.60	5.71	7.31	185.09	0.18	0.139	20
18	229.43	221.05	12.57	7.19	245.97	-0.11	-0.190	21
20	234.00	234.38	13.15	17.79	120.22	0.49	0.360	21
22	259.80	270.95	22.20	40.04	-33.13	1.17	0.649	20

February 1991 Rome-Dourbes MUF(3000)F2

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	16.46	14.09	2.97	2.54	2.88	0.68	0.796	20
2	15.76	13.37	3.04	2.49	3.24	0.64	0.784	21
4	16.31	13.22	2.78	2.80	1.41	0.72	0.720	21
6	14.56	12.29	3.64	3.33	1.16	0.76	0.835	21
8	33.31	33.53	2.81	3.14	11.36	0.67	0.596	21
10	39.78	40.83	2.54	2.79	44.40	-0.09	-0.082	20
12	40.14	40.57	1.58	1.59	27.75	0.32	0.319	18
14	37.37	38.52	1.55	1.73	16.25	0.60	0.535	18
16	36.54	36.85	2.10	1.93	17.18	0.54	0.585	19
18	30.94	29.67	1.76	3.07	-3.25	1.06	0.609	19
20	23.96	20.36	3.31	3.11	5.64	0.61	0.655	21
22	18.03	16.18	2.52	3.28	-1.98	1.01	0.776	20

February 1991 Rome-Roquetes F0F2

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	5.94	5.90	0.82	0.70	1.69	0.71	0.826	25
2	5.90	5.89	0.95	1.21	0.45	0.92	0.720	25
4	5.77	5.74	0.90	0.91	1.87	0.67	0.660	25
6	5.04	4.76	1.10	0.95	1.10	0.73	0.848	25
8	10.55	9.81	0.88	1.44	-2.55	1.17	0.717	25
10	12.74	12.83	0.83	1.11	1.74	0.87	0.653	27
12	13.26	13.06	0.57	0.91	1.69	0.86	0.536	27
14	12.75	12.20	0.66	0.63	7.18	0.39	0.415	27
16	12.07	9.90	0.76	1.56	4.07	0.48	0.235	28
18	9.77	7.44	0.70	1.09	1.48	0.61	0.390	27
20	7.82	6.55	1.21	0.76	4.71	0.24	0.375	28
22	6.40	6.09	0.96	0.77	2.72	0.53	0.657	27

February 1991 Rome-Roquetes H`F

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	286.53	288.30	37.68	34.56	80.07	0.73	0.792	27
2	298.56	299.96	33.37	28.74	124.74	0.59	0.681	25
4	285.12	276.52	26.95	23.21	116.25	0.56	0.653	25
6	253.68	254.36	29.78	30.96	28.20	0.89	0.857	25
8	224.88	226.16	9.35	15.33	188.14	0.17	0.103	25
10	222.00	225.57	4.32	7.45	183.29	0.19	0.110	28
12	225.64	229.07	8.38	6.26	142.84	0.38	0.512	28
14	225.21	234.18	5.53	4.84	196.06	0.17	0.194	28
16	234.00	237.68	5.42	5.21	134.86	0.44	0.456	28
18	229.71	232.53	11.53	10.46	189.68	0.19	0.206	28
20	234.43	236.04	11.65	14.32	84.54	0.65	0.526	28
22	258.67	262.78	20.20	31.24	-41.78	1.18	0.761	27

February 1991 Rome-Roquetes MUF(3000)F2

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	16.44	16.64	2.81	2.77	4.10	0.76	0.774	27
2	15.58	16.03	2.68	3.40	0.78	0.98	0.770	25
4	16.04	16.54	2.72	3.07	4.08	0.78	0.689	25
6	14.34	13.69	3.15	3.02	1.76	0.83	0.867	25
8	32.91	33.01	2.87	2.72	12.84	0.61	0.646	25
10	39.55	39.76	2.59	2.64	13.33	0.67	0.656	27
12	39.81	39.05	1.58	1.80	3.67	0.89	0.777	26
14	37.02	35.82	1.78	1.77	11.20	0.67	0.668	26
16	35.98	32.63	2.18	2.40	26.62	0.17	0.152	26
18	30.87	25.99	1.76	2.94	9.27	0.54	0.324	26
20	24.33	22.18	3.40	2.60	9.81	0.51	0.666	28
22	18.03	18.03	2.63	2.83	4.50	0.75	0.699	27

February 1991 Dourbes-Roquetes F0F2

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	5.34	5.88	0.84	0.77	2.54	0.63	0.686	17
2	5.18	5.86	0.86	1.21	-0.45	1.22	0.864	18
4	4.88	5.80	0.88	0.93	2.96	0.58	0.550	19
6	4.11	4.71	1.00	0.98	1.59	0.76	0.769	19
8	9.21	9.76	1.06	1.50	3.30	0.70	0.492	19
10	12.74	12.92	0.95	1.04	10.23	0.21	0.193	21
12	13.43	13.03	0.93	0.82	8.69	0.32	0.368	20
14	12.69	12.09	0.81	0.80	6.81	0.42	0.417	20
16	11.85	9.94	0.54	1.67	-4.14	1.19	0.381	20
18	10.02	7.47	1.06	1.19	3.45	0.40	0.354	21
20	6.71	6.64	1.14	0.57	5.62	0.15	0.301	21
22	5.81	6.06	0.92	0.85	2.57	0.60	0.648	19

February 1991 Dourbes-Roquetes H`F

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	305.42	292.79	48.28	37.55	67.07	0.74	0.950	19
2	314.11	298.89	39.29	31.24	82.40	0.69	0.867	19
4	281.32	273.16	27.70	23.64	79.75	0.69	0.806	19
6	259.89	252.11	35.87	32.13	37.17	0.83	0.923	19
8	222.95	228.58	7.50	15.35	121.92	0.48	0.234	19
10	221.00	225.81	5.80	8.39	207.72	0.08	0.057	21
12	221.93	228.30	5.04	6.49	225.19	0.01	0.011	20
14	225.30	233.70	4.14	4.86	212.43	0.09	0.081	20
16	226.60	236.70	7.31	5.73	156.18	0.36	0.453	20
18	221.05	231.24	7.19	8.85	78.07	0.69	0.563	21
20	234.38	236.10	17.79	14.29	117.32	0.51	0.631	21
22	271.53	262.74	41.05	37.18	52.16	0.78	0.856	19

February 1991 Dourbes-Roquetes MUF(3000)F2

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	14.08	16.43	2.61	2.99	2.42	0.99	0.871	19
2	13.35	16.43	2.53	3.60	0.06	1.23	0.863	19
4	13.21	16.91	2.73	3.23	5.31	0.88	0.741	19
6	12.23	13.68	3.30	3.34	3.86	0.80	0.795	19
8	33.27	33.23	3.19	2.78	20.50	0.38	0.439	19
10	40.81	40.25	2.72	2.29	52.75	-0.31	-0.364	21
12	40.41	39.47	1.62	1.84	23.28	0.40	0.353	20
14	38.63	35.96	1.68	2.09	13.99	0.57	0.457	20
16	36.88	32.74	1.89	2.48	14.73	0.49	0.371	20
18	29.64	26.06	2.99	3.18	9.98	0.54	0.510	21
20	20.36	22.29	3.11	2.45	15.64	0.33	0.415	21
22	16.21	17.93	3.36	3.22	4.37	0.84	0.873	19

March 1991 Rome-Dourbes F0F2

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	7.66	6.34	1.00	1.35	-2.73	1.19	0.873	26
2	7.37	5.74	0.89	1.07	-0.78	0.89	0.736	27
4	6.67	5.30	0.81	1.11	-2.62	1.19	0.864	27
6	6.48	5.45	1.05	0.91	1.15	0.66	0.766	27
8	11.02	9.17	1.73	1.91	-0.37	0.87	0.787	27
10	13.06	11.37	1.47	2.07	-1.71	1.00	0.714	28
12	13.48	12.45	1.30	1.86	-0.97	1.00	0.693	29
14	13.24	12.28	0.91	1.40	-2.71	1.13	0.738	29
16	12.82	11.72	0.62	0.87	-1.59	1.04	0.744	28
18	11.45	11.16	0.97	0.93	6.51	0.41	0.423	27
20	9.46	8.26	0.63	0.88	5.81	0.26	0.187	27
22	8.42	6.83	1.02	1.19	-0.01	0.81	0.701	26

March 1991 Rome-Dourbes H`F

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	300.89	326.11	52.93	67.15	-23.08	1.16	0.915	27
2	298.67	323.85	34.60	44.26	22.93	1.01	0.738	27
4	303.33	320.48	44.51	73.46	-74.72	1.30	0.789	27
6	276.67	261.52	38.07	27.39	102.28	0.58	0.800	27
8	233.56	234.15	7.79	10.08	104.29	0.56	0.430	27
10	222.00	225.11	7.30	8.67	227.88	-0.01	-0.011	28
12	222.83	223.10	12.39	9.66	189.03	0.15	0.196	29
14	227.59	233.91	7.84	18.57	110.02	0.54	0.230	29
16	236.79	235.96	5.29	5.82	259.56	-0.10	-0.091	28
18	244.07	234.04	15.41	12.48	108.80	0.51	0.634	28
20	245.79	248.75	24.14	19.15	141.62	0.44	0.549	28
22	265.78	292.31	23.35	53.03	-18.45	1.17	0.515	27

March 1991 Rome-Dourbes MUF(3000)F2

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	19.66	16.18	3.48	3.78	-2.70	0.96	0.883	27
2	18.98	14.56	2.93	3.56	-5.16	1.04	0.855	27
4	17.15	13.56	3.01	3.35	-2.76	0.95	0.854	27
6	17.24	17.36	3.33	3.61	3.17	0.82	0.759	27
8	32.79	29.51	5.66	6.93	-1.48	0.95	0.771	27
10	38.14	34.44	5.72	6.06	2.34	0.84	0.795	28
12	38.20	35.35	4.38	5.21	-1.36	0.96	0.806	29
14	36.58	34.56	3.61	4.46	-4.84	1.08	0.873	29
16	35.73	33.78	2.54	3.89	-10.78	1.25	0.815	28
18	34.51	31.91	3.06	3.07	10.80	0.61	0.609	27
20	26.86	23.10	2.15	3.03	6.27	0.63	0.444	28
22	23.30	18.78	3.16	3.61	-1.75	0.88	0.771	26

March 1991 Rome-Roquetes F0F2

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	7.77	6.17	1.06	1.98	-2.51	1.12	0.600	29
2	7.46	7.24	0.96	1.15	0.01	0.97	0.808	28
4	6.73	6.29	0.83	1.43	-2.72	1.34	0.774	28
6	6.59	6.38	1.08	1.17	0.40	0.91	0.835	29
8	11.13	10.60	1.68	1.94	0.45	0.91	0.790	30
10	13.11	12.77	1.43	1.80	-1.38	1.08	0.857	30
12	13.45	13.37	1.29	1.40	1.60	0.88	0.804	29
14	13.26	12.76	0.91	1.36	-4.45	1.30	0.867	29
16	12.85	11.35	0.63	1.26	-2.21	1.06	0.533	29
18	11.45	8.82	0.94	1.69	0.23	0.75	0.415	28
20	9.47	7.05	0.61	0.71	5.03	0.21	0.182	29
22	8.47	6.71	1.01	0.74	5.22	0.17	0.237	28

March 1991 Rome-Roquetes H`F

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	300.62	306.03	52.41	60.97	25.30	0.93	0.803	29
2	295.66	306.17	35.17	34.09	63.81	0.82	0.846	29
4	300.21	306.07	45.59	61.08	-18.57	1.08	0.807	28
6	274.97	267.90	36.95	35.20	86.19	0.66	0.694	29
8	232.80	239.50	7.78	23.12	-14.93	1.09	0.368	30
10	222.20	233.53	7.30	13.52	358.97	-0.56	-0.305	30
12	223.20	232.07	12.35	21.50	285.50	-0.24	-0.137	30
14	228.21	240.12	8.09	25.74	489.88	-1.09	-0.344	29
16	237.52	247.97	5.20	22.18	805.81	-2.35	-0.551	29
18	243.93	249.03	15.07	16.86	130.59	0.49	0.434	29
20	245.60	257.33	23.63	19.71	197.13	0.25	0.294	30
22	267.52	278.79	23.10	32.29	16.40	0.98	0.702	29

March 1991 Rome-Roquetes MUF(3000)F2

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	20.03	17.88	3.59	6.10	-9.57	1.37	0.807	29
2	19.46	19.51	3.26	4.17	-2.30	1.12	0.875	29
4	17.40	16.91	3.08	4.44	-4.61	1.24	0.858	28
6	17.53	18.18	3.37	4.01	0.62	1.00	0.843	29
8	32.78	32.26	5.48	6.77	-2.80	1.07	0.866	30
10	38.32	37.06	5.55	5.93	1.19	0.94	0.876	30
12	38.07	36.86	4.27	4.67	-0.38	0.98	0.895	30
14	36.49	34.66	3.63	4.21	-4.82	1.08	0.932	29
16	35.67	33.58	2.51	3.43	-8.45	1.18	0.863	29
18	34.41	29.83	2.98	4.50	0.51	0.85	0.565	28
20	26.82	22.89	2.08	2.43	11.58	0.42	0.362	30
22	23.30	20.86	3.07	3.06	7.81	0.56	0.561	28

March 1991 Dourbes-Roquetes F0F2

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	6.29	6.13	1.35	2.02	1.30	0.77	0.515	26
2	5.63	7.15	1.05	1.15	2.67	0.80	0.724	26
4	5.20	6.17	1.14	1.45	0.78	1.04	0.817	26
6	5.44	6.32	0.91	1.19	0.82	1.01	0.775	27
8	9.12	10.32	1.89	1.98	3.57	0.74	0.707	28
10	11.46	12.72	2.05	1.89	4.94	0.68	0.735	27
12	12.51	13.39	1.91	1.45	6.00	0.59	0.778	27
14	12.34	12.76	1.43	1.40	2.74	0.81	0.831	27
16	11.74	11.35	0.90	1.33	0.66	0.91	0.617	26
18	11.17	8.84	0.95	1.78	2.76	0.54	0.292	26
20	8.18	7.00	0.93	0.67	5.96	0.13	0.177	27
22	6.69	6.52	1.22	1.08	4.44	0.31	0.351	27

March 1991 Dourbes-Roquetes H`F

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	328.07	309.96	66.83	62.44	60.53	0.76	0.814	27
2	325.59	310.04	43.51	32.71	89.80	0.68	0.900	27
4	324.23	309.38	73.53	62.14	49.95	0.80	0.947	26
6	261.15	268.07	27.62	36.46	43.39	0.86	0.652	27
8	233.82	240.25	10.04	23.77	198.48	0.18	0.075	28
10	225.67	233.07	8.30	14.19	176.70	0.25	0.146	27
12	222.93	232.00	9.79	22.12	357.35	-0.56	-0.249	28
14	234.54	239.83	19.11	26.64	189.59	0.21	0.154	27
16	235.81	248.19	6.02	23.44	110.78	0.58	0.150	26
18	233.65	249.00	12.77	17.78	77.91	0.73	0.526	26
20	249.26	256.44	19.32	20.59	103.48	0.61	0.576	27
22	295.94	276.00	54.08	33.35	144.44	0.44	0.721	27

March 1991 Dourbes-Roquetes MUF(3000)F2

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	15.98	17.26	3.81	6.03	-1.45	1.17	0.739	27
2	14.37	19.02	3.58	4.04	4.87	0.98	0.871	27
4	13.29	16.39	3.45	4.38	1.46	1.12	0.884	26
6	17.39	17.80	3.63	3.85	1.55	0.93	0.881	27
8	29.41	31.68	6.82	6.88	8.86	0.78	0.769	28
10	34.68	37.00	6.04	6.25	8.96	0.81	0.781	27
12	35.45	36.89	5.28	4.83	9.47	0.77	0.845	28
14	34.66	34.72	4.61	4.36	4.47	0.87	0.922	27
16	33.90	33.64	4.02	3.62	7.28	0.78	0.864	26
18	31.95	29.86	3.13	4.72	7.81	0.69	0.458	26
20	23.05	22.85	3.08	2.48	15.97	0.30	0.371	27
22	18.09	20.04	4.18	4.03	6.13	0.77	0.797	27

April 1991 Rome-Dourbes F0F2

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	8.51	7.11	1.07	1.28	-0.75	0.92	0.769	27
2	8.05	6.38	1.04	1.05	-0.75	0.89	0.872	29
4	7.00	5.51	0.95	0.97	-0.67	0.88	0.862	29
6	8.11	6.99	1.16	1.11	0.59	0.79	0.828	29
8	10.53	8.62	1.93	1.35	2.47	0.58	0.834	28
10	11.96	10.15	1.91	1.66	0.94	0.77	0.883	28
12	12.71	11.06	1.65	1.61	0.53	0.83	0.848	28
14	12.31	10.61	1.47	1.57	-1.70	1.00	0.932	27
16	11.63	10.29	1.31	1.38	-1.01	0.97	0.924	28
18	11.16	10.11	1.06	1.27	0.93	0.82	0.688	28
20	9.50	8.61	0.95	0.95	1.79	0.72	0.713	28
22	8.72	7.39	1.20	1.05	1.52	0.67	0.772	28

April 1991 Rome-Dourbes H`F

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	303.72	314.52	25.93	24.14	131.85	0.60	0.646	29
2	295.03	310.28	18.98	23.13	56.00	0.86	0.707	29
4	279.93	311.62	24.49	21.69	199.40	0.40	0.453	29
6	254.14	247.86	13.47	14.60	132.96	0.45	0.417	29
8	228.93	236.34	7.82	15.47	106.80	0.57	0.286	29
10	224.14	234.54	10.48	43.57	455.41	-0.99	-0.237	28
12	226.22	228.26	28.33	15.38	196.38	0.14	0.260	27
14	227.78	232.26	8.72	8.03	180.28	0.23	0.248	27
16	236.46	241.46	7.79	8.01	258.64	-0.07	-0.071	28
18	260.50	251.46	24.73	12.24	211.24	0.15	0.312	28
20	252.86	252.39	18.81	13.58	147.38	0.42	0.575	28
22	277.93	293.46	25.46	26.08	102.33	0.69	0.671	28

April 1991 Rome-Dourbes MUF(3000)F2

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	21.81	17.74	3.20	3.48	-1.83	0.90	0.823	29
2	21.17	16.03	3.20	3.03	-2.29	0.87	0.913	29
4	18.15	14.30	2.97	2.80	0.54	0.76	0.806	29
6	22.63	21.38	3.35	3.62	5.27	0.71	0.657	29
8	29.61	25.32	6.36	4.37	8.70	0.56	0.816	29
10	31.90	27.79	6.07	4.83	5.35	0.70	0.885	28
12	33.55	29.74	4.83	4.76	0.29	0.88	0.890	28
14	32.42	28.71	4.49	4.63	-2.62	0.97	0.938	27
16	31.19	28.11	4.33	4.21	-0.06	0.90	0.929	28
18	31.20	29.10	3.42	3.76	1.50	0.88	0.804	28
20	26.57	23.84	2.93	3.06	5.31	0.70	0.667	28
22	22.89	19.07	3.50	3.00	5.62	0.59	0.686	28

April 1991 Rome-Roquetes F0F2

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	8.26	6.27	1.18	1.73	2.27	0.48	0.329	20
2	7.79	6.48	1.13	1.65	-0.35	0.88	0.598	20
4	6.78	5.96	1.02	1.81	-1.52	1.10	0.622	20
6	7.98	7.85	1.15	0.88	5.14	0.34	0.445	19
8	10.35	10.25	2.34	1.92	3.12	0.69	0.837	17
10	11.70	11.06	2.21	1.75	2.89	0.70	0.879	18
12	12.42	11.65	1.96	2.15	0.74	0.88	0.801	19
14	11.97	11.40	1.59	1.65	0.46	0.91	0.883	18
16	11.35	10.27	1.36	1.58	2.95	0.65	0.557	20
18	10.97	7.81	1.21	1.58	2.80	0.46	0.348	20
20	9.19	6.42	0.99	0.83	5.01	0.15	0.183	20
22	8.43	5.61	1.27	1.89	0.18	0.64	0.432	20

April 1991 Rome-Roquetes H\`F

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	301.20	311.29	26.73	38.02	62.74	0.83	0.580	20
2	299.40	310.60	20.22	27.07	33.07	0.93	0.693	20
4	282.30	301.05	23.40	28.02	195.71	0.37	0.312	20
6	255.58	251.32	15.30	17.95	95.97	0.61	0.518	19
8	228.83	235.78	8.96	11.79	129.06	0.47	0.355	18
10	224.00	238.44	10.08	25.83	69.54	0.75	0.294	18
12	230.53	247.59	32.39	44.53	-9.04	1.11	0.810	19
14	227.05	248.84	9.22	18.35	41.04	0.92	0.460	19
16	237.00	248.40	9.03	11.25	189.61	0.25	0.199	20
18	262.10	254.65	28.21	14.74	263.86	-0.04	-0.067	20
20	252.00	243.65	19.56	21.00	156.12	0.35	0.324	20
22	275.70	305.15	24.81	34.42	214.77	0.33	0.236	20

April 1991 Rome-Roquetes MUF(3000)F2

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	21.30	18.67	3.53	5.18	4.07	0.69	0.467	20
2	20.33	18.54	3.35	4.67	-4.43	1.13	0.810	20
4	17.36	15.87	2.70	4.21	-2.64	1.07	0.683	20
6	22.26	24.75	3.23	3.53	11.43	0.60	0.548	19
8	28.72	29.67	7.77	5.05	14.54	0.53	0.811	18
10	31.14	31.16	6.79	5.69	6.86	0.78	0.930	18
12	32.82	31.89	5.48	5.78	0.61	0.95	0.904	19
14	31.49	31.19	4.18	4.37	1.34	0.95	0.907	19
16	30.68	29.97	3.99	3.98	7.04	0.75	0.749	20
18	30.89	26.79	3.72	4.33	9.04	0.57	0.495	20
20	26.12	21.28	2.94	2.12	21.35	-0.00	-0.004	20
22	21.97	17.07	3.79	5.69	-2.51	0.89	0.594	20

April 1991 Dourbes-Roquetes F0F2

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	6.77	6.22	1.34	1.84	0.22	0.89	0.649	17
2	6.14	6.46	1.04	1.69	1.72	0.77	0.475	19
4	5.16	5.96	0.96	1.86	0.49	1.06	0.550	19
6	6.85	7.80	1.11	0.87	5.56	0.33	0.416	18
8	8.43	10.25	1.47	1.92	-0.16	1.24	0.944	17
10	10.04	11.06	1.85	1.75	3.04	0.80	0.842	18
12	10.88	11.71	1.87	2.19	3.62	0.74	0.634	18
14	10.25	11.45	1.73	1.70	3.03	0.82	0.835	15
16	10.23	10.27	1.54	1.63	4.76	0.54	0.510	18
18	9.94	7.86	1.42	1.58	2.34	0.55	0.499	18
20	8.53	6.46	1.01	0.85	4.42	0.24	0.285	18
22	7.14	5.60	1.07	1.99	2.23	0.47	0.253	18

April 1991 Dourbes-Roquetes H`F

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	319.26	311.36	26.39	39.06	139.85	0.54	0.363	19
2	315.21	311.26	23.65	27.64	52.87	0.82	0.702	19
4	314.11	299.89	19.58	28.30	110.07	0.60	0.418	19
6	246.83	250.67	17.79	18.24	219.05	0.13	0.125	18
8	238.39	235.78	18.08	11.79	165.65	0.29	0.451	18
10	235.78	238.44	54.16	25.83	237.96	0.00	0.004	18
12	227.06	248.40	17.85	45.67	48.96	0.88	0.343	18
14	232.56	247.94	4.82	19.67	389.93	-0.61	-0.150	16
16	240.06	247.22	7.60	11.06	225.30	0.09	0.063	18
18	249.78	254.28	13.08	15.44	74.27	0.72	0.610	18
20	250.67	242.78	10.62	21.09	-68.22	1.24	0.625	18
22	295.78	303.72	29.00	36.05	90.43	0.72	0.580	18

April 1991 Dourbes-Roquetes MUF(3000)F2

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	16.89	18.66	3.67	5.32	1.45	1.02	0.702	19
2	15.24	18.38	3.17	4.74	2.33	1.05	0.704	19
4	13.52	15.78	2.85	4.31	4.13	0.86	0.570	19
6	21.29	24.69	3.67	3.62	8.54	0.76	0.768	18
8	24.95	29.67	5.11	5.05	6.71	0.92	0.932	18
10	27.51	31.16	5.49	5.69	6.45	0.90	0.865	18
12	29.33	32.06	5.15	5.90	6.84	0.86	0.751	18
14	28.03	31.23	4.37	4.67	7.89	0.83	0.778	16
16	28.11	30.16	4.62	4.16	11.67	0.66	0.729	18
18	29.14	26.97	3.94	4.20	8.16	0.65	0.605	18
20	23.56	21.31	3.10	2.20	13.21	0.34	0.484	18
22	18.52	17.02	3.27	6.01	2.36	0.79	0.430	18

May 1991 Rome-Dourbes F0F2

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	7.77	6.70	0.89	1.05	-1.18	1.02	0.862	25
2	7.30	5.82	0.82	1.12	-0.81	0.91	0.663	28
4	6.57	5.66	0.90	0.91	-0.26	0.90	0.892	29
6	8.12	7.04	1.22	1.34	-0.20	0.89	0.812	28
8	8.60	7.81	1.59	1.67	-0.16	0.93	0.882	28
10	9.31	8.34	1.77	1.76	-0.14	0.91	0.919	27
12	9.98	8.35	1.78	1.39	1.28	0.71	0.904	27
14	10.11	8.39	1.62	1.55	-0.45	0.87	0.913	26
16	9.77	8.38	1.46	1.07	1.67	0.69	0.943	26
18	9.73	8.28	1.32	1.34	0.45	0.80	0.796	26
20	9.06	8.39	1.03	1.06	-0.01	0.93	0.900	26
22	8.03	7.06	1.10	1.30	1.43	0.70	0.589	25

May 1991 Rome-Dourbes H`F

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	310.29	311.32	24.38	21.02	172.95	0.45	0.517	28
2	306.64	322.18	17.76	31.79	42.01	0.91	0.511	28
4	306.00	300.76	36.53	22.72	176.65	0.41	0.652	29
6	256.86	248.57	14.88	21.67	157.23	0.36	0.244	28
8	234.67	229.19	15.90	11.84	154.36	0.32	0.428	27
10	228.00	228.46	20.92	24.71	264.71	-0.16	-0.135	26
12	232.60	234.81	35.33	44.36	185.27	0.21	0.170	27
14	237.69	239.31	20.09	32.25	48.82	0.80	0.499	26
16	245.86	245.16	14.73	26.48	201.15	0.18	0.100	25
18	273.64	255.65	16.36	15.95	184.96	0.26	0.265	26
20	271.21	252.74	30.07	22.15	164.34	0.33	0.443	27
22	295.92	282.64	44.45	25.94	197.21	0.29	0.495	25

May 1991 Rome-Dourbes MUF(3000)F2

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	20.00	16.78	2.64	2.90	-0.45	0.86	0.785	28
2	18.98	14.41	2.49	3.30	-2.33	0.88	0.665	28
4	17.09	15.53	2.87	3.07	-0.62	0.95	0.883	29
6	22.73	20.31	4.22	4.35	0.55	0.87	0.845	28
8	23.48	22.05	5.36	4.78	4.91	0.73	0.819	29
10	24.07	23.25	5.23	3.81	8.14	0.63	0.861	27
12	26.17	22.85	5.04	3.44	8.87	0.53	0.784	27
14	27.27	23.18	4.98	4.49	5.55	0.65	0.718	26
16	26.70	23.34	4.37	3.11	6.33	0.64	0.895	26
18	27.30	23.71	4.00	3.96	2.32	0.78	0.791	27
20	26.43	23.06	3.29	3.33	-0.26	0.88	0.872	27
22	21.33	18.52	3.47	3.79	2.88	0.73	0.670	25

May 1991 Rome-Roquetes F0F2

LT	$\overline{x}$	$\overline{y}$	Sx	Sy	b0	b1	r	N
0	7.77	5.49	0.85	1.31	5.78	-0.04	-0.024	27
2	7.29	5.88	0.82	1.12	4.15	0.24	0.173	27
4	6.56	5.91	0.91	1.14	1.49	0.67	0.537	28
6	8.04	7.45	1.27	1.19	2.49	0.62	0.659	28
8	8.53	8.07	1.60	1.66	0.14	0.93	0.896	28
10	9.20	8.44	1.71	1.97	0.54	0.86	0.748	29
12	9.89	9.20	1.74	1.72	2.25	0.70	0.714	29
14	9.95	9.45	1.63	1.78	0.27	0.92	0.843	29
16	9.55	9.21	1.52	1.55	1.16	0.84	0.824	30
18	9.50	7.56	1.40	1.40	4.46	0.33	0.327	30
20	9.03	5.95	1.11	1.01	4.54	0.16	0.171	28
22	8.03	5.66	1.09	1.12	1.84	0.48	0.461	28

May 1991 Rome-Roquetes H`F

LT	$\overline{x}$	$\overline{y}$	Sx	Sy	b0	b1	r	N
0	310.44	305.48	24.72	46.78	274.48	0.10	0.053	27
2	307.11	308.03	17.69	41.11	174.57	0.43	0.187	27
4	308.14	313.29	35.67	41.56	78.78	0.76	0.653	28
6	254.93	248.50	15.18	22.20	253.62	-0.02	-0.014	28
8	234.86	258.79	16.63	59.59	-137.09	1.69	0.470	28
10	228.00	246.92	20.98	44.53	199.67	0.21	0.098	28
12	232.74	242.77	34.44	26.46	201.67	0.18	0.230	30
14	236.07	248.71	19.85	27.21	188.28	0.26	0.187	29
16	246.29	270.31	14.46	31.90	243.38	0.11	0.050	29
18	272.44	268.09	15.98	49.77	401.63	-0.49	-0.157	29
20	271.33	253.98	28.95	44.13	263.73	-0.04	-0.024	29
22	294.64	285.34	42.87	42.48	234.00	0.17	0.176	28

May 1991 Rome-Roquetes MUF(3000)F2

LT	$\overline{x}$	$\overline{y}$	Sx	Sy	b0	b1	r	N
0	20.02	16.93	2.61	4.29	12.95	0.20	0.121	27
2	18.93	16.67	2.51	3.21	7.30	0.49	0.388	27
4	17.04	16.43	2.87	3.68	-1.21	1.03	0.809	28
6	22.54	22.86	4.32	4.30	4.76	0.80	0.807	28
8	23.38	23.34	5.34	4.61	5.69	0.76	0.876	29
10	23.74	23.46	5.05	4.02	8.42	0.63	0.796	29
12	25.84	24.66	4.94	4.07	8.31	0.63	0.768	30
14	26.81	25.68	4.97	4.50	4.54	0.79	0.870	29
16	26.10	25.77	4.64	4.08	7.06	0.72	0.815	30
18	26.75	24.58	4.28	3.75	8.92	0.59	0.669	30
20	26.30	20.51	3.57	3.40	7.50	0.49	0.520	29
22	21.31	17.59	3.52	3.57	3.83	0.65	0.636	28

June 1991 Rome-Dourbes F0F2

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	7.66	6.29	0.88	1.41	-2.61	1.16	0.726	20
2	6.92	5.27	1.08	1.57	-2.48	1.12	0.767	20
4	5.95	5.34	1.15	1.27	-0.74	1.02	0.924	19
6	7.38	6.24	1.28	1.29	0.68	0.75	0.749	19
8	7.81	6.94	1.36	1.43	1.25	0.73	0.696	18
10	8.18	7.06	1.42	1.39	0.29	0.83	0.843	17
12	8.34	7.13	1.73	1.44	0.78	0.76	0.915	20
14	8.25	7.06	1.47	1.27	0.57	0.79	0.913	21
16	7.97	7.07	1.38	1.11	1.80	0.66	0.828	21
18	8.23	7.00	1.23	1.31	0.37	0.80	0.755	19
20	8.26	7.09	1.19	1.31	1.19	0.71	0.650	21
22	8.02	6.63	0.81	1.54	-4.38	1.37	0.722	21

June 1991 Rome-Dourbes H`F

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	319.20	323.40	29.50	41.37	122.46	0.63	0.449	20
2	314.70	341.20	44.79	101.82	7.51	1.06	0.466	20
4	317.68	288.95	41.88	41.30	87.41	0.63	0.643	19
6	258.00	244.74	18.00	32.40	-27.86	1.06	0.587	19
8	236.69	264.90	26.04	57.88	324.43	-0.25	-0.113	20
10	244.17	261.84	38.73	57.19	170.61	0.37	0.253	19
12	238.26	219.94	41.53	19.07	164.06	0.23	0.511	18
14	223.50	247.69	28.01	48.13	16.64	1.03	0.602	16
16	249.90	268.05	51.66	89.41	310.59	-0.17	-0.098	20
18	266.22	277.06	19.59	62.78	113.54	0.61	0.192	18
20	280.02	264.29	40.69	42.13	108.72	0.56	0.537	21
22	306.57	308.48	39.20	42.60	169.93	0.45	0.416	21

June 1991 Rome-Dourbes MUF(3000)F2

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	19.60	15.74	2.79	4.19	-6.60	1.14	0.759	20
2	18.40	13.51	3.64	4.40	-2.32	0.86	0.712	20
4	14.96	15.29	4.15	3.97	7.36	0.53	0.555	20
6	20.00	18.14	4.17	4.00	5.01	0.66	0.684	19
8	21.88	19.62	4.90	3.70	8.65	0.50	0.664	18
10	20.77	20.01	4.25	2.52	11.67	0.40	0.679	18
12	21.28	20.27	5.53	2.67	14.11	0.29	0.600	20
14	21.62	19.40	4.66	2.68	10.26	0.42	0.735	21
16	21.57	19.40	4.40	2.80	8.68	0.50	0.782	21
18	23.21	20.54	3.53	4.74	3.55	0.73	0.545	20
20	23.56	19.59	4.07	4.46	2.09	0.74	0.678	21
22	21.22	17.37	2.77	4.06	-4.59	1.03	0.708	21

May 1991 Dourbes-Roquetes F0F2

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	6.65	5.44	1.06	1.35	5.94	-0.07	-0.058	25
2	5.76	5.88	1.10	1.10	2.84	0.53	0.525	28
4	5.63	5.90	0.94	1.14	1.82	0.72	0.594	28
6	6.98	7.49	1.38	1.20	3.52	0.57	0.650	27
8	7.76	8.03	1.74	1.72	1.40	0.85	0.860	27
10	8.22	8.42	1.86	2.05	1.50	0.84	0.761	27
12	8.26	9.22	1.44	1.79	1.60	0.92	0.740	27
14	8.24	9.48	1.62	1.87	1.68	0.95	0.817	26
16	8.25	9.25	1.24	1.67	0.44	1.07	0.792	27
18	8.21	7.53	1.35	1.47	4.16	0.41	0.379	27
20	8.30	5.90	1.08	0.97	4.88	0.12	0.137	27
22	7.04	5.65	1.28	1.16	3.17	0.35	0.389	26

May 1991 Dourbes-Roquetes H`F

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	309.54	309.57	22.01	44.63	52.00	0.83	0.410	28
2	324.50	311.31	30.88	38.86	171.28	0.43	0.343	28
4	300.21	317.57	23.04	39.31	8.22	1.03	0.604	28
6	248.22	247.70	22.18	22.38	181.24	0.27	0.265	27
8	230.19	258.93	12.43	60.25	148.75	0.48	0.099	27
10	228.89	236.90	24.33	15.55	212.00	0.11	0.170	27
12	235.18	245.75	43.58	24.23	238.63	0.03	0.054	28
14	238.81	245.83	32.53	24.27	228.04	0.07	0.100	26
16	245.56	272.48	25.94	33.71	224.70	0.19	0.150	27
18	255.54	270.05	15.39	52.13	79.25	0.75	0.220	28
20	251.07	253.27	21.06	45.95	65.87	0.75	0.342	27
22	281.88	287.42	25.71	43.06	184.74	0.36	0.217	26

May 1991 Dourbes-Roquetes MUF(3000)F2

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	16.72	16.88	2.90	4.17	15.98	0.05	0.038	28
2	14.15	16.68	3.19	3.18	5.59	0.78	0.785	28
4	15.43	16.31	3.16	3.73	0.38	1.03	0.877	28
6	20.21	23.12	4.48	4.30	10.02	0.65	0.675	27
8	22.15	23.57	4.94	4.68	6.76	0.76	0.801	27
10	23.11	23.48	3.90	4.29	3.59	0.86	0.781	27
12	22.60	24.58	3.62	4.42	5.10	0.86	0.705	28
14	22.80	25.81	4.55	4.70	6.21	0.86	0.832	26
16	23.08	25.89	3.33	4.43	0.24	1.11	0.836	27
18	23.49	24.72	4.06	3.80	11.69	0.55	0.592	28
20	22.95	20.44	3.37	3.29	10.41	0.44	0.448	27
22	18.47	17.57	3.72	3.66	9.05	0.46	0.469	26

June 1991 Rome-Roquetes F0F2

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	7.65	5.99	0.92	1.10	-0.12	0.80	0.666	28
2	6.86	5.75	0.99	1.16	1.98	0.55	0.469	28
4	5.83	5.80	1.13	0.97	1.46	0.74	0.872	28
6	7.09	6.59	1.26	1.21	1.75	0.68	0.708	28
8	7.66	7.41	1.41	1.32	2.25	0.67	0.720	20
10	8.15	7.94	1.39	1.23	3.15	0.59	0.668	22
12	8.39	8.24	1.65	1.43	3.06	0.62	0.714	23
14	8.29	8.45	1.43	1.44	1.99	0.78	0.774	27
16	7.99	8.03	1.25	1.26	3.80	0.53	0.522	27
18	8.22	7.65	1.10	0.99	3.05	0.56	0.621	26
20	8.43	6.27	1.07	0.93	4.54	0.21	0.239	28
22	8.08	5.70	0.92	1.27	-0.30	0.74	0.537	29

June 1991 Rome-Roquetes H`F

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	324.00	307.85	40.50	37.85	390.10	-0.25	-0.272	28
2	320.14	306.86	44.13	48.79	289.27	0.05	0.050	28
4	335.79	326.57	60.32	60.97	112.39	0.64	0.631	28
6	265.91	271.71	25.19	31.99	239.29	0.12	0.096	28
8	245.27	277.74	39.30	67.30	243.51	0.14	0.082	25
10	236.38	277.49	39.65	71.31	290.03	-0.05	-0.029	22
12	238.03	286.84	30.54	103.88	569.96	-1.19	-0.350	21
14	230.86	302.29	27.81	80.00	298.56	0.02	0.006	22
16	250.89	294.11	45.85	56.82	264.71	0.12	0.095	27
18	263.42	262.50	19.48	26.09	314.92	-0.20	-0.149	24
20	285.16	265.55	38.21	36.15	175.93	0.31	0.332	28
22	302.69	276.28	35.41	52.19	284.32	-0.03	-0.018	29

June 1991 Rome-Roquetes MUF(3000)F2

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	19.49	17.86	2.79	3.79	4.06	0.71	0.521	28
2	17.93	16.51	3.35	3.17	6.16	0.58	0.610	28
4	14.52	15.63	4.01	3.55	5.58	0.69	0.784	29
6	18.94	19.42	4.26	4.24	7.31	0.64	0.642	28
8	20.45	20.89	5.41	4.29	9.77	0.54	0.685	24
10	20.92	21.67	4.14	3.42	10.53	0.53	0.645	22
12	21.50	22.23	5.23	3.72	11.56	0.50	0.697	23
14	21.71	22.77	4.50	3.78	7.74	0.69	0.824	27
16	21.81	22.26	3.90	3.64	12.40	0.45	0.485	28
18	23.09	22.69	3.15	3.86	2.72	0.86	0.705	27
20	23.76	19.96	3.81	3.20	12.24	0.32	0.387	28
22	21.21	17.82	2.89	3.54	6.66	0.53	0.430	29

June 1989 Dourbes-Roquetes F0F2

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	6.32	5.94	1.38	1.16	3.75	0.35	0.415	21
2	5.23	5.73	1.55	1.35	3.70	0.39	0.446	21
4	5.37	5.92	1.22	0.99	3.26	0.50	0.608	21
6	6.14	6.90	1.36	1.30	2.62	0.70	0.730	21
8	7.16	7.71	1.29	1.14	3.60	0.57	0.649	15
10	7.11	8.27	1.40	1.14	3.90	0.61	0.751	15
12	6.89	8.22	1.45	1.61	2.27	0.86	0.777	17
14	7.03	8.50	1.32	1.62	1.95	0.93	0.758	19
16	7.03	8.05	1.12	1.38	3.34	0.67	0.544	20
18	7.02	7.61	1.31	1.04	4.81	0.40	0.501	21
20	7.14	6.21	1.28	1.02	3.74	0.35	0.434	21
22	6.64	5.68	1.50	1.32	3.66	0.30	0.348	22

June 1989 Dourbes-Roquetes H`F

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	323.48	299.38	40.32	38.62	353.07	-0.17	-0.173	21
2	339.95	303.43	99.40	47.44	296.58	0.02	0.042	21
4	284.90	308.04	41.76	56.80	86.83	0.78	0.571	21
6	245.86	266.67	32.22	34.67	258.84	0.03	0.030	21
8	271.47	285.82	56.37	76.16	204.26	0.30	0.222	19
10	259.00	263.65	62.59	61.05	286.63	-0.09	-0.091	15
12	221.53	303.92	26.35	110.07	179.33	0.56	0.135	17
14	255.68	330.21	49.97	87.12	376.88	-0.18	-0.105	19
16	270.80	302.70	89.18	59.56	346.42	-0.16	-0.242	20
18	275.76	264.90	58.89	30.64	265.28	-0.00	-0.003	21
20	264.14	267.33	42.08	38.84	126.13	0.53	0.579	21
22	308.23	273.27	41.59	52.75	141.90	0.43	0.336	22

June 1989 Dourbes-Roquetes MUF(3000)F2

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	15.72	17.96	4.08	4.23	10.33	0.49	0.469	21
2	13.47	16.51	4.30	3.59	9.14	0.55	0.655	21
4	15.25	16.35	3.87	3.47	7.52	0.58	0.644	21
6	18.06	20.87	4.01	4.48	8.66	0.68	0.606	21
8	19.34	22.53	3.77	4.86	13.98	0.44	0.342	19
10	20.13	22.35	2.53	3.39	7.51	0.74	0.550	15
12	20.01	22.92	2.62	3.25	13.38	0.48	0.385	17
14	19.45	22.91	2.79	4.13	6.29	0.85	0.578	19
16	19.32	22.54	2.84	3.89	6.27	0.84	0.615	20
18	20.72	23.18	4.69	4.14	9.50	0.66	0.748	21
20	19.81	19.97	4.32	3.57	9.39	0.53	0.646	21
22	17.39	17.77	3.96	3.46	12.48	0.30	0.348	22

July 1991 Rome-Dourbes F0F2

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	7.56	5.89	0.86	1.51	3.89	0.26	0.151	26
2	6.84	5.58	0.87	1.25	-3 18	1.28	0.888	28
4	6.02	5.21	1.03	1.12	-0.45	0.94	0.860	29
6	6.86	5.83	1.26	1.31	0.42	0.79	0.759	29
8	7.69	6.84	1.29	1.45	-0.49	0.95	0.850	28
10	8.09	7.10	1.22	1.21	-0.06	0.89	0.896	27
12	8.72	7.27	1.27	1.13	1.02	0.72	0.804	28
14	8.64	7.23	1.21	1.07	1.65	0.65	0.726	29
16	8.36	6.97	0.94	0.80	3.16	0.46	0.535	29
18	8.15	6.95	0.86	1.49	-1.32	1.01	0.584	30
20	8.26	7.26	1.04	1.05	-0.02	0.88	0.872	29
22	7.73	6.78	1.01	1.35	-1.67	1.09	0.818	30

July 1991 Rome-Dourbes H`F

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	311.90	306.29	33.99	44.15	243.78	0.20	0.154	28
2	307.86	333.62	22.46	71.52	-302.63	2.07	0.649	29
4	311.38	299.52	62.87	33.63	271.62	0.09	0.168	29
6	269.10	258.21	36.87	52.80	266.36	-0.03	-0.021	28
8	242.62	260.80	16.74	79.22	107.75	0.63	0.133	21
10	236.52	249.00	35.45	41.12	241.59	0.03	0.027	23
12	238.35	236.44	31.18	41.58	209.49	0.11	0.085	27
14	247.85	230.38	51.87	26.73	165.46	0.26	0.508	26
16	246.98	257.89	30.31	65.18	-20.82	1.13	0.525	28
18	265.53	257.59	21.97	23.02	314.07	-0.21	-0.203	30
20	277.00	263.24	31.40	33.95	138.85	0.45	0.415	29
22	300.80	306.87	38.72	33.25	230.91	0.25	0.294	30

July 1991 Rome-Dourbes MUF(3000)F2

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	19.94	15.21	2.75	3.46	9.24	0.30	0.238	28
2	17.94	13.92	2.64	3.45	-6.44	1.13	0.866	28
4	15.89	13.70	2.87	3.05	0.79	0.81	0.765	29
6	18.98	17.04	3.95	3.75	3.63	0.71	0.745	29
8	21.22	19.38	4.52	4.00	5.52	0.65	0.738	27
10	21.30	19.71	3.57	2.63	8.35	0.53	0.726	27
12	22.96	20.14	3.55	2.73	11.14	0.39	0.509	28
14	23.30	19.98	3.43	3.03	15.48	0.19	0.218	29
16	23.31	18.85	2.88	2.57	9.91	0.38	0.429	30
18	22.92	19.75	2.42	4.63	-3.12	1.00	0.521	30
20	23.67	20.16	3.34	3.19	-0.27	0.86	0.904	29
22	20.81	17.78	2.67	4.02	-5.59	1.12	0.745	30

July 1991 Rome-Roquetes F0F2

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	7.50	6.07	1.20	1.36	3.96	0.28	0.248	28
2	6.98	5.94	1.04	0.91	3.08	0.41	0.466	26
4	6.11	5.51	1.11	1.11	1.72	0.62	0.625	28
6	6.96	6.57	1.30	1.17	1.57	0.72	0.792	30
8	7.73	7.32	1.30	1.33	1.17	0.80	0.780	26
10	8.19	7.87	1.20	1.28	0.34	0.92	0.856	24
12	8.93	8.46	1.30	1.49	0.65	0.87	0.763	25
14	8.71	8.53	1.27	1.32	0.64	0.91	0.869	29
16	8.40	8.06	0.96	1.04	3.29	0.57	0.525	30
18	8.17	7.63	0.88	0.95	2.95	0.57	0.530	29
20	8.30	6.22	1.07	1.07	4.35	0.23	0.225	28
22	7.73	5.98	1.05	1.30	3.33	0.34	0.278	29

July 1991 Rome-Roquetes H`F

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	319.56	292.01	39.33	62.46	238.23	0.17	0.106	29
2	309.00	313.25	22.36	38.13	172.96	0.45	0.266	28
4	313.29	308.71	64.30	56.98	161.66	0.47	0.530	28
6	269.34	268.97	36.23	38.27	169.39	0.37	0.350	29
8	242.57	292.80	16.68	79.99	263.57	0.12	0.025	21
10	243.04	298.31	37.57	80.51	83.31	0.88	0.413	24
12	233.39	268.88	28.86	63.85	321.49	-0.23	-0.102	24
14	249.33	284.83	51.69	63.84	159.82	0.50	0.406	27
16	247.68	291.22	30.65	66.64	318.08	-0.11	-0.050	27
18	266.30	260.41	22.53	35.13	189.73	0.27	0.170	30
20	278.45	262.78	30.97	34.84	282.16	-0.07	-0.062	29
22	301.66	307.39	39.18	41.88	206.44	0.33	0.313	29

July 1991 Rome-Roquetes MUF(3000)F2

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	19.56	17.73	3.59	3.40	10.62	0.36	0.383	29
2	18.29	17.08	3.06	3.18	3.57	0.74	0.712	27
4	16.10	15.17	3.13	3.11	3.65	0.71	0.719	28
6	19.11	19.17	3.93	4.30	3.85	0.80	0.733	30
8	21.31	21.48	4.29	3.94	6.94	0.68	0.742	27
10	21.44	21.64	3.56	3.12	8.84	0.60	0.682	25
12	23.36	23.07	3.68	3.43	5.06	0.77	0.828	25
14	23.46	23.15	3.51	3.39	4.54	0.79	0.822	29
16	23.24	22.73	2.84	2.81	8.89	0.60	0.602	30
18	22.94	23.83	2.42	2.85	4.87	0.83	0.700	30
20	23.66	19.83	3.34	3.25	9.16	0.45	0.463	29
22	20.80	17.75	2.74	3.67	3.90	0.67	0.496	29

August 1991 Rome-Dourbes F0F2

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	6.50	5.39	0.89	0.89	0.44	0.76	0.764	22
2	6.13	4.64	0.85	0.93	0.23	0.72	0.651	23
4	5.48	4.15	0.99	1.14	-0.60	0.87	0.751	23
6	6.70	5.42	1.17	1.38	-0.75	0.92	0.780	23
8	8.17	6.77	1.77	1.48	0.87	0.72	0.867	23
10	8.77	7.56	1.50	1.42	0.99	0.75	0.792	22
12	9.11	7.70	1.46	1.38	0.01	0.84	0.894	22
14	9.21	7.56	1.45	1.41	-0.86	0.91	0.938	22
16	8.96	7.75	1.04	1.04	-0.20	0.89	0.889	23
18	9.13	7.90	0.85	0.94	-0.11	0.88	0.793	22
20	8.35	7.02	1.20	1.43	0.11	0.83	0.697	22
22	7.08	6.09	1.08	1.12	-0.07	0.87	0.838	23

August 1991 Rome-Dourbes H`F

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	320.35	334.09	38.28	36.33	213.52	0.38	0.397	23
2	321.65	341.30	29.43	36.19	106.44	0.73	0.594	23
4	311.57	338.96	52.49	44.22	275.39	0.20	0.242	23
6	264.78	266.74	25.48	46.49	204.34	0.24	0.129	23
8	231.82	250.85	13.15	56.20	265.31	-0.06	-0.015	20
10	233.23	231.40	28.95	30.20	266.83	-0.15	-0.146	20
12	224.15	254.35	26.87	51.18	183.04	0.32	0.167	20
14	231.00	236.48	17.04	35.13	203.18	0.14	0.070	23
16	245.18	255.41	16.28	35.36	307.95	-0.21	-0.099	22
18	266.29	243.48	23.20	26.44	141.01	0.38	0.338	21
20	267.00	287.74	21.08	75.99	501.06	-0.80	-0.222	23
22	303.83	316.00	39.37	88.19	66.87	0.82	0.366	23

August 1991 Rome-Dourbes MUF(3000)F2

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	16.56	13.37	2.70	2.26	3.62	0.59	0.705	23
2	15.50	11.17	2.34	2.77	-0.81	0.77	0.651	23
4	14.15	10.50	2.86	2.73	-0.31	0.76	0.799	23
6	18.70	16.40	3.90	4.47	1.09	0.82	0.714	23
8	23.50	20.03	6.57	4.56	6.28	0.58	0.842	23
10	23.90	22.48	5.20	5.07	10.09	0.52	0.531	22
12	24.82	21.04	3.68	4.20	-3.28	0.98	0.858	22
14	25.01	21.39	4.37	3.37	5.39	0.64	0.830	23
16	24.87	21.77	3.45	3.53	0.45	0.86	0.836	23
18	26.18	22.91	2.64	3.46	-3.54	1.01	0.771	22
20	24.48	18.20	3.94	5.30	4.34	0.57	0.421	23
22	18.87	15.47	3.42	3.32	-0.14	0.83	0.853	23

July 1991 Dourbes-Roquetes F0F2

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	5.76	6.20	1.53	1.09	6.79	-0.10	-0.146	25
2	5.60	5.94	1.31	0.93	3.76	0.39	0.548	25
4	5.20	5.57	1.16	1.07	2.20	0.65	0.699	26
6	5.81	6.43	1.33	1.08	2.63	0.65	0.810	28
8	6.66	7.15	1.42	1.27	2.52	0.70	0.776	25
10	7.10	7.80	1.21	1.20	1.94	0.83	0.829	21
12	7.28	8.29	1.17	1.53	0.99	1.00	0.768	24
14	7.21	8.42	1.11	1.29	2.10	0.88	0.753	27
16	6.98	8.08	0.82	1.06	3.11	0.71	0.547	28
18	6.92	7.62	1.54	0.97	5.10	0.36	0.579	28
20	7.22	6.27	1.09	1.04	5.81	0.06	0.067	26
22	6.70	6.00	1.37	1.32	3.18	0.42	0.436	28

July 1991 Dourbes-Roquetes H`F

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	307.69	286.01	45.54	55.13	366.11	-0.26	-0.215	26
2	337.35	316.31	74.53	35.30	276.90	0.12	0.247	26
4	295.20	312.19	24.42	56.19	108.44	0.69	0.300	26
6	257.86	269.57	52.87	37.40	307.80	-0.15	-0.210	28
8	264.54	286.55	80.06	73.92	295.94	-0.04	-0.038	27
10	247.39	284.54	41.90	72.22	233.44	0.21	0.120	23
12	235.37	261.79	43.81	57.81	182.31	0.34	0.256	24
14	230.00	285.57	26.40	63.86	55.60	1.00	0.413	27
16	268.55	295.35	78.36	67.71	328.18	-0.12	-0.142	29
18	257.23	261.46	23.34	35.27	290.11	-0.11	-0.074	29
20	266.22	259.65	33.28	33.95	277.41	-0.07	-0.065	27
22	308.93	306.86	33.37	42.55	177.46	0.42	0.329	28

July 1991 Dourbes-Roquetes MUF(3000)F2

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	15.00	17.90	3.48	2.99	14.53	0.22	0.262	26
2	13.85	16.99	3.53	3.22	7.66	0.67	0.739	26
4	13.75	15.17	3.10	3.12	4.74	0.76	0.754	26
6	17.05	18.81	3.82	4.11	4.45	0.84	0.783	28
8	18.99	21.01	3.89	4.06	7.76	0.70	0.670	27
10	19.54	21.50	2.51	2.82	5.99	0.79	0.706	23
12	20.45	22.59	2.67	3.75	5.18	0.85	0.605	24
14	20.01	22.89	3.14	3.31	16.86	0.30	0.286	27
16	18.87	22.64	2.62	2.81	11.61	0.58	0.545	29
18	19.76	23.81	4.71	2.90	16.56	0.37	0.595	29
20	20.10	19.93	3.30	3.22	12.39	0.37	0.384	27
22	17.60	17.74	4.11	3.74	8.18	0.54	0.596	28

September 1991 Rome-Dourbes F0F2

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	6.59	5.38	0.67	1.15	-1.22	1.00	0.582	29
2	6.28	4.97	0.81	0.90	0.48	0.72	0.643	29
4	5.70	4.51	0.64	0.93	-1.55	1.06	0.729	29
6	6.52	5.55	1.05	1.03	1.04	0.69	0.708	30
8	9.29	7.75	1.81	1.41	3.12	0.50	0.640	30
10	10.36	9.09	1.63	1.50	1.58	0.72	0.784	29
12	10.92	9.68	1.35	1.39	0.94	0.80	0.775	29
14	10.91	9.77	1.40	1.43	0.12	0.88	0.866	30
16	11.04	9.61	1.19	1.06	2.62	0.63	0.711	30
18	10.64	9.40	0.92	1.26	1.55	0.74	0.535	30
20	8.53	7.84	0.78	1.02	0.28	0.89	0.676	30
22	6.81	6.01	0.85	1.01	1.08	0.72	0.612	30

September 1991 Rome-Dourbes H`F

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	316.00	325.38	37.56	40.25	208.92	0.37	0.344	30
2	319.66	339.02	30.67	36.32	115.38	0.70	0.591	29
4	310.80	346.33	32.38	74.74	6.52	1.09	0.474	30
6	261.40	258.17	29.46	27.68	77.44	0.69	0.736	30
8	239.59	236.28	20.86	28.81	169.71	0.28	0.201	29
10	222.22	228.89	13.26	17.38	118.88	0.50	0.378	27
12	228.80	229.20	19.31	21.04	118.49	0.48	0.444	30
14	226.47	233.03	14.51	22.03	195.71	0.16	0.108	30
16	236.78	241.72	6.60	14.53	285.69	-0.19	-0.084	27
18	248.70	235.27	15.61	23.20	258.42	-0.09	-0.063	30
20	247.20	254.93	15.87	22.42	195.33	0.24	0.171	30
22	279.40	293.27	30.62	41.81	202.41	0.33	0.238	30

September 1991 Rome-Dourbes MUF(3000)F2

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	16.95	13.68	2.27	2.75	1.99	0.69	0.570	30
2	16.09	12.40	2.83	2.84	-0.48	0.80	0.797	29
4	14.66	11.11	2.16	2.63	-3.91	1.02	0.839	30
6	18.87	17.83	3.84	3.94	3.87	0.74	0.721	30
8	28.50	24.42	6.10	5.51	11.62	0.45	0.497	30
10	30.44	27.33	5.14	4.23	9.72	0.58	0.702	29
12	30.64	27.86	4.11	4.25	1.74	0.85	0.824	30
14	30.54	28.03	3.91	4.05	1.72	0.86	0.831	30
16	31.78	28.12	3.75	3.66	10.35	0.56	0.573	30
18	32.53	28.20	3.22	3.51	8.36	0.61	0.558	30
20	25.53	21.79	2.75	3.10	-0.72	0.88	0.780	30
22	18.31	15.34	2.68	2.80	2.28	0.71	0.682	30

September 1991 Rome-Roquetes F0F2

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	6.66	5.80	0.64	1.02	3.85	0.29	0.183	27
2	6.30	5.66	0.83	0.97	2.81	0.45	0.385	27
4	5.69	5.29	0.68	0.64	1.49	0.67	0.716	27
6	6.45	6.14	1.00	0.91	1.08	0.79	0.859	29
8	9.29	8.60	1.84	1.78	1.11	0.81	0.838	29
10	10.28	9.52	1.73	1.64	1.33	0.80	0.840	28
12	10.86	10.27	1.38	1.56	-0.14	0.96	0.849	29
14	11.05	10.60	1.24	1.32	2.52	0.73	0.687	28
16	11.17	10.57	1.07	0.92	4.25	0.57	0.659	28
18	10.71	8.72	0.87	1.68	-1.27	0.93	0.483	29
20	8.53	6.93	0.78	0.86	4.14	0.33	0.297	30
22	6.86	5.97	0.84	0.85	0.76	0.76	0.751	28

September 1991 Rome-Roquetes H`F

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	315.64	330.11	37.43	33.79	146.59	0.58	0.644	28
2	318.67	327.70	29.22	30.90	89.32	0.75	0.707	27
4	310.00	330.63	33.57	43.56	40.45	0.94	0.721	27
6	261.52	271.55	29.98	23.10	184.53	0.33	0.432	29
8	239.59	250.24	20.86	15.82	134.53	0.48	0.637	29
10	224.08	238.88	16.09	18.01	188.84	0.22	0.200	26
12	228.62	247.37	19.63	47.01	112.31	0.59	0.247	29
14	226.62	247.97	14.74	21.60	181.01	0.30	0.202	29
16	236.52	255.72	5.85	14.54	272.22	-0.07	-0.028	25
18	249.00	246.48	15.79	21.18	183.38	0.25	0.189	29
20	247.20	249.00	15.87	24.11	68.19	0.73	0.481	30
22	278.69	303.28	30.91	31.95	144.00	0.57	0.553	29

September 1991 Rome-Roquetes MUF(3000)F2

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	17.04	15.61	2.25	2.93	6.27	0.55	0.421	28
2	16.14	15.30	2.87	3.47	1.90	0.83	0.686	27
4	14.69	13.93	2.27	2.86	-1.90	1.08	0.854	27
6	18.61	18.38	3.63	3.98	3.42	0.80	0.732	29
8	28.50	26.38	6.10	6.12	3.70	0.80	0.794	30
10	30.13	27.92	5.46	5.42	5.32	0.75	0.755	28
12	30.59	29.18	4.18	4.07	4.66	0.80	0.823	29
14	30.56	29.50	3.97	3.76	4.17	0.83	0.877	29
16	32.15	31.01	3.45	3.00	12.00	0.59	0.679	28
18	32.74	28.92	3.06	3.84	6.57	0.68	0.545	29
20	25.53	22.46	2.75	3.05	8.52	0.55	0.493	30
22	18.35	17.28	2.72	3.20	3.40	0.76	0.641	29

September 1991 Dourbes-Roquetes F0F2

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	5.41	5.79	1.20	1.04	4.85	0.17	0.203	26
2	4.98	5.67	0.95	0.98	2.63	0.61	0.589	26
4	4.55	5.32	0.97	0.63	3.27	0.45	0.687	26
6	5.50	6.14	1.01	0.91	2.00	0.75	0.830	29
8	7.73	8.60	1.43	1.78	2.03	0.85	0.687	29
10	9.02	9.63	1.53	1.55	2.59	0.78	0.772	27
12	9.68	10.38	1.41	1.49	2.95	0.77	0.731	28
14	9.92	10.60	1.25	1.32	4.45	0.62	0.587	28
16	9.72	10.57	0.93	0.92	4.30	0.64	0.651	28
18	9.44	8.72	1.27	1.68	3.88	0.51	0.386	29
20	7.84	6.93	1.02	0.86	5.55	0.18	0.209	30
22	6.03	5.97	1.04	0.85	3.78	0.36	0.442	28

September 1991 Dourbes-Roquetes H`F

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	330.37	330.11	34.43	33.79	72.20	0.78	0.795	28
2	338.75	328.38	36.83	31.30	108.81	0.65	0.763	26
4	347.81	330.63	78.59	43.56	202.78	0.37	0.663	27
6	258.86	271.55	27.91	23.10	135.40	0.53	0.635	29
8	237.07	249.57	28.63	15.98	244.15	0.02	0.041	30
10	228.07	240.48	15.61	17.64	216.32	0.11	0.094	27
12	230.45	247.37	20.25	47.01	188.17	0.26	0.111	29
14	234.07	247.97	21.67	21.60	188.27	0.26	0.256	29
16	240.69	254.18	14.87	14.61	248.61	0.02	0.024	28
18	234.66	246.48	23.37	21.18	216.18	0.13	0.142	29
20	254.93	249.00	22.42	24.11	198.90	0.20	0.183	30
22	293.11	303.28	42.54	31.95	187.40	0.40	0.526	29

September 1991 Dourbes-Roquetes MUF(3000)F2

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	13.57	15.61	2.81	2.93	7.40	0.60	0.580	28
2	12.47	15.34	2.98	3.54	2.28	1.05	0.881	26
4	11.23	13.93	2.71	2.86	3.25	0.95	0.900	27
6	17.64	18.38	3.87	3.98	3.19	0.86	0.837	29
8	24.42	26.38	5.51	6.12	9.15	0.71	0.636	30
10	27.06	28.25	4.20	5.24	7.64	0.76	0.610	27
12	27.85	29.18	4.33	4.07	9.37	0.71	0.756	29
14	28.05	29.50	4.12	3.76	9.83	£ 0.70	0.769	29
16	28.49	31.01	3.33	3.00	13.77	0.60	0.671	28
18	28.33	28.92	3.50	3.84	18.85	0.36	0.324	29
20	21.79	22.46	3.10	3.05	9.62	0.59	0.601	30
22	15.34	17.28	2.85	3.20	5.82	0.75	0.663	29

October 1991 Rome-Dourbes FOF2

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	6.20	5.19	0.90	1.24	-0.71	0.95	0.693	20
2	5.91	4.80	0.88	1.25	-1.76	1.11	0.778	20
4	5.45	4.67	0.86	1.15	-0.96	1.03	0.771	18
6	5.43	4.53	0.96	0.82	0.26	0.79	0.915	19
8	10.27	9.53	2.00	2.12	2.31	0.70	0.663	19
10	11.97	11.09	2.57	2.96	-1.14	1.02	0.888	19
12	12.86	11.86	2.35	2.80	-1.50	1.04	0.874	19
14	12.54	11.62	1.72	2.62	-6.39	1.44	0.942	19
16	12.36	10.83	1.66	2.06	-2.98	1.12	0.903	20
18	9.98	8.78	1.41	2.11	-3.56	1.24	0.825	20
20	7.51	6.75	1.02	1.39	-0.38	0.95	0.699	21
22	6.45	5.47	0.87	1.23	2.05	0.53	0.376	21

October 1991 Rome-Dourbes H`F

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	308.70	324.75	46.29	49.01	320.83	0.01	0.012	20
2	305.90	342.40	34.13	55.75	103.99	0.78	0.477	20
4	306.00	313.39	50.99	91.62	29.23	0.93	0.517	18
6	272.21	269.05	63.44	55.66	64.70	0.75	0.856	19
8	239.37	231.23	22.79	29.51	-59.74	1.22	0.939	19
10	230.67	226.17	12.56	22.89	-96.42	1.40	0.767	18
12	235.00	220.39	17.85	16.55	39.56	0.77	0.830	18
14	232.50	226.95	11.33	23.97	21.76	0.88	0.417	20
16	238.50	226.65	10.09	23.38	-113.72	1.43	0.616	20
18	230.57	243.62	15.48	35.34	115.63	0.56	0.243	21
20	264.57	250.77	42.72	39.38	223.56	0.10	0.112	21
22	290.29	314.95	38.63	53.90	139.08	0.61	0.434	21

October 1991 Rome-Dourbes MUF(3000)F2

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	16.23	13.66	2.97	3.65	4.42	0.57	0.464	20
2	15.46	11.96	2.81	3.62	-3.91	1.03	0.797	20
4	14.42	12.72	3.28	3.97	1.19	0.80	0.662	18
6	14.33	14.80	3.72	3.75	1.00	0.96	0.953	19
8	31.24	30.33	7.23	7.25	4.07	0.84	0.838	19
10	35.99	34.49	9.32	9.51	1.20	0.93	0.907	19
12	38.04	35.22	8.40	8.41	0.16	0.92	0.921	19
14	35.67	35.07	5.46	8.01	-5.67	1.14	0.779	20
16	37.18	32.31	5.11	7.42	-14.07	1.25	0.859	20
18	30.74	24.64	4.33	7.98	-15.61	1.31	0.711	21
20	21.72	18.00	4.16	4.94	-0.42	0.85	0.713	21
22	17.44	14.17	2.94	4.21	3.26	0.63	0.437	21

October 1991 Rome-Roquetes F0F2

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	6.05	5.47	0.82	1.10	0.09	0.89	0.663	29
2	5.69	5.25	0.77	1.06	-0.12	0.94	0.685	29
4	5.24	5.08	0.81	1.09	-1.02	1.16	0.863	28
6	5.45	5.44	0.80	0.78	0.61	0.89	0.913	29
8	9.70	9.35	2.14	2.08	0.48	0.91	0.941	31
10	11.40	10.60	2.57	2.51	0.30	0.90	0.923	30
12	12.53	11.07	2.13	2.52	-1.69	1.02	0.862	31
14	12.43	11.26	1.48	1.79	-2.43	1.10	0.913	31
16	12.29	10.87	1.47	1.49	0.28	0.86	0.850	31
18	10.04	8.04	1.19	1.71	-0.15	0.82	0.570	31
20	7.46	6.35	0.89	1.01	2.54	0.51	0.451	31
22	6.41	5.63	0.82	1.11	0.62	0.78	0.578	31

October 1991 Rome-Roquetes H`F

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	312.40	308.30	51.49	48.70	320.14	-0.04	-0.040	30
2	312.76	319.41	38.97	53.95	72.91	0.79	0.569	29
4	314.48	327.52	51.00	68.76	68.70	0.82	0.610	29
6	274.55	286.14	55.49	53.50	49.28	0.86	0.895	29
8	239.23	251.48	19.76	20.03	58.56	0.81	0.796	31
10	232.93	247.86	17.08	26.39	123.38	0.53	0.346	28
12	233.68	242.65	22.19	22.38	95.51	0.63	0.624	29
14	231.48	246.74	11.47	14.29	176.08	0.31	0.245	31
16	240.19	248.35	12.05	30.29	199.83	0.20	0.080	31
18	231.48	255.31	13.75	38.65	158.08	0.42	0.149	31
20	260.90	267.84	37.05	33.37	130.92	0.52	0.583	31
22	294.39	314.00	40.90	53.83	69.75	0.83	0.630	31

October 1991 Rome-Roquetes MUF(3000)F2

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	15.93	15.79	3.04	3.59	7.24	0.54	0.454	30
2	14.71	14.72	2.43	4.28	-4.07	1.28	0.726	29
4	13.68	13.32	2.88	3.64	-1.71	1.10	0.870	29
6	14.45	15.47	3.19	3.29	1.96	0.93	0.908	29
8	29.43	29.32	7.63	7.26	2.60	0.91	0.954	31
10	34.13	32.52	9.23	8.66	2.10	0.89	0.951	30
12	36.65	33.67	7.58	7.86	-0.77	0.94	0.906	31
14	35.58	33.24	4.77	5.70	-4.89	1.07	0.897	31
16	36.91	33.98	4.71	4.99	-1.28	0.96	0.902	31
18	31.09	26.68	3.94	5.17	-0.33	0.87	0.661	31
20	21.50	19.47	3.64	4.04	2.17	0.80	0.724	31
22	17.20	15.90	2.65	4.24	-4.82	1.20	0.752	31

October 1989 Dourbes-Roquetes F0F2

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	5.11	5.66	1.22	1.19	2.18	0.68	0.695	19
2	4.73	5.45	1.24	1.15	2.08	0.71	0.767	19
4	4.67	5.25	1.15	1.25	2.29	0.63	0.583	18
6	4.62	5.54	0.75	0.85	1.11	0.96	0.838	18
8	9.53	9.92	2.12	1.94	5.03	0.51	0.560	19
10	11.27	11.34	2.93	2.44	3.31	0.71	0.856	18
12	11.86	11.53	2.80	2.57	1.90	0.81	0.884	19
14	11.62	11.27	2.62	1.83	4.11	0.62	0.879	19
16	10.83	10.85	2.06	1.55	4.26	0.61	0.807	20
18	8.78	8.32	2.11	1.63	2.82	0.63	0.811	20
20	6.75	6.23	1.39	1.16	1.88	0.65	0.772	21
22	5.47	5.84	1.23	1.03	3.63	0.40	0.482	21

October 1989 Dourbes-Roquetes H`F

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	324.75	300.15	49.01	44.71	123.69	0.54	0.596	20
2	344.47	310.63	56.48	60.21	160.67	0.44	0.408	19
4	313.39	303.72	91.62	59.99	274.06	0.09	0.145	18
6	259.67	279.61	38.83	52.70	-33.04	1.20	0.887	18
8	231.23	248.53	29.51	18.61	112.41	0.59	0.934	19
10	224.94	245.12	22.70	21.83	70.97	0.77	0.805	18
12	220.26	240.67	16.10	18.62	68.42	0.78	0.676	19
14	226.95	248.60	23.97	14.46	183.65	0.29	0.474	20
16	226.65	241.65	23.38	21.75	167.69	0.33	0.351	20
18	243.62	255.04	35.34	45.16	174.66	0.33	0.258	21
20	250.77	272.90	39.38	32.75	199.50	0.29	0.352	21
22	314.95	313.10	53.90	56.26	189.72	0.39	0.375	21

October 1989 Dourbes-Roquetes MUF(3000)F2

LT	$\bar{x}$	$\bar{y}$	Sx	Sy	b0	b1	r	N
0	13.66	16.51	3.65	3.48	6.21	0.75	0.790	20
2	11.73	15.72	3.56	4.76	3.99	1.00	0.748	19
4	12.72	14.54	3.97	3.90	8.82	0.45	0.458	18
6	15.23	15.89	3.34	3.54	1.26	0.96	0.905	18
8	30.33	31.59	7.25	6.44	8.76	0.75	0.848	19
10	35.17	35.31	9.30	8.02	7.60	0.79	0.913	18
12	35.22	35.16	8.41	7.58	6.17	0.82	0.912	19
14	35.07	33.34	8.01	5.90	14.88	0.53	0.714	20
16	32.31	34.23	7.42	5.25	14.77	0.60	0.851	20
18	24.64	26.59	7.98	5.43	13.64	0.53	0.771	21
20	18.00	19.37	4.94	4.56	7.57	0.66	0.711	21
22	14.17	16.53	4.21	4.33	11.30	0.37	0.360	21

APPENDIX 3

Tables of mean spatial monthly gradients (x') and RMS (Sx) of critical frequency foF2 between stations Rome, Dourbes and Roquetes for September 1990 - August 1991 in MHz/10000 km as functions of Local Time.